HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU PAGES	C	REASON FOR CHANGE	EFFECTIVITY

CHAPTER 24

L.E.P. 1- 8 Revised to Reflect this revision indicating new,revised, and/or deleted pages

T. OF C. 4- 15 Revised to reflect this revision

24-11-24 01 901
Minor additions and amplification
CHANGED MMEL REF FROM
1-24 ITEM 24A TO 1-24 ITEM 29

24-11-24 02 901
Minor additions and amplification
CHANGED MMEL REF FROM
1-24 ITEM 24A TO 1-24 ITEM 29

24-11-27 01 401, 403- 413
Layout Improved or Effectivity Updated

24-24-00
Effectivity updated at the bottom of the page

506- 515
Minor additions and amplification
REVISED ACTION-RESULT SEQUENCES FOR LEFT INNER TANK PUMP 2 AND RIGHT INNER TANK PUMP 1
Layout improved
IN 430VU MOVED FAULT LEGEND FOR LEFT INNER TANK PUMP 2 AND RIGHT INNER PUMP TANK PUMP 1

24-31-00
Mod.5910S6764 incorporated

401- 402
ELECTRICAL POWER - INSTALL SYSTEM PROVISION FOR INSTALLATION OF AN AC/DC STANDBY GENERATI HYDRO-ELECTRICAL UNIT
Minor additions and amplification
DELETED STEP RELATED TO C/B

24-31-11
Minor, non technical corrections

401- 403
ADDED TITLES IN TABLE OF CONTENTS
Minor additions and amplification
ADDED MENTION TO REMOVE COPPER SHEAR WIRE

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
24-32-00 501	Minor additions and amplification UPDATED REASON FOR THE JOB TO BE IN LINE WITH MPD	
24-50-20 13- 14	Layout Improved or Effectivity Updated	
24-51-00 1- 2	Effectivity updated at the bottom of the page Effectivity updated in the text Deletion of the mention Post SB 24-2067 03 ELECTRICAL POWER - MODIFY AC POWER LOAD DISTR IBUTION FOR 50A C/B'S 1XN, 2XN, 4XN	
24-92-00 604, 606- 607, 609- 610, 612, 614, 616- 617, 619, 621, 624- 626, 628- 629, 631- 632, 634, 636- 693	Minor additions and amplification UPDATED TOPIC ACCORDING TO THE EWIS REQUIREMENTS	
24-92-00 701, 703- 704, 706- 751	Minor additions and amplification UPDATED TOPIC ACCORDING TO THE EWIS REQUIREMENTS Reprinted	

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CHAPTER 24

ELECTRICAL POWER

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

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RECORD OF TEMP. REVISION			
L.E.P.	R	1- 8	Jun01/10
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T. of C.		2	Jun01/08
T. of C.		3	Jun01/08
T. of C.	R	4	Jun01/10
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T. of C.	R	6	Jun01/10
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T. of C.	R	10	Jun01/10
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24-00-00		2	Jun01/94
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24-00-00		4	Dec01/90
24-00-00		5	Jun01/94
24-00-00		6	Jun01/94
24-00-00		7	Jun01/94
24-00-00		8	Dec01/90
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24-00-00		11	Dec01/90
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24-00-00		13	Jun01/95
24-00-00		14	Jun01/95
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24-00-00		16	Jun01/97
24-00-00		17	Jun01/97
24-00-00		18	Dec01/06
24-00-00		19	Dec01/06
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24-00-00		21	Jun01/94
24-00-00		22	Jun01/97
24-00-00		23	Dec01/90
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24-00-00		26	Dec01/06
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R	General Visual Inspection of All EWIS Connections Between Seats and Aircraft, and of EWIS at Seats Installed as Far as Visible in Aft Main Deck Compartment Area			640	ALL
R	General Visual Inspection of EWIS Inside Panel 811VU			643	ALL
R	General Visual Inspection of APU Feed Line and Power G, E and P Route EWIS in Ceiling Area			645	ALL
R	Detailed Inspection of APU Feeders and Starter Cable at Rear Bulkhead EWIS Pressure Seals			648	ALL
R	General Visual Inspection of G Route EWIS Within APU and Accessory Compartment			649	ALL
R	Detailed Inspection of Horizontal Stabilizer Center Section Exposed EWIS Inside Fuel Tank			652	ALL
R	Detailed Inspection of Horizontal Stabilizer Spar Box Exposed EWIS Inside Fuel Tank			656	ALL
R	General Visual Inspection of EWIS Within Slat Track/Screw Jack Area Installed in Fixed Leading Edge Area (From Rib 2 to Rib 9)			660	ALL
R	General Visual Inspection of All EWIS Within Slat Track/Screw Jack Area Installed in Center Fixed Leading Edge Area (From Rib 9 to Rib 19)			664	ALL
R	General Visual Inspection of All EWIS Within Slat Track/Screw Jack Area Installed in Outboard Fixed Leading Edge Area (From Rib 19 to Rib 30)			668	ALL
R	Detailed Inspection of All Exposed EWIS Installed in Inboard Fuel Tank(Ribs 1 to 14)			672	ALL
R	Detailed Inspection of All Exposed EWIS Installed in Outboard Fuel Tank			676	ALL
R	General Visual Inspection of All EWIS Within Fairings on Main Gear Well (EWIS)			680	ALL
R	General Visual Inspection of EWIS Installed Within Flap Track 2-Gearbox Area			682	ALL
R	General Visual Inspection of EWIS Installed Within Fairing in Fixed Trailing Edge Area (From Ribs 11 to 25)			686	ALL

	SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
R	General Visual Inspection of All EWIS Installed Within Fixed Trailing Edge Area (From Ribs 25 to to 31)			688	ALL
R	General Visual Inspection of All EWIS Within Bay Aft of FWD Cargo Compartment			692	ALL
	Cleaning			701	ALL
R	Cleaning of EWIS Installed in Avionics Compartment (Only Contaminated EWIS)			701	ALL
R	Cleaning of All Power Feeder EWIS Installed in FWD Cargo Compartment (Only Contaminated EWIS)			704	ALL
R	Cleaning of All PDU Supply EWIS Installed in Bay Under FWD Cargo Compartment (Only Contaminated EWIS)			707	ALL
R	Cleaning of All EWIS in Area Around PDU Feeder Pressure Seals Installed in Bay Aft of FWD Cargo Compartment (Only Contaminated EWIS)			710	ALL
R	Cleaning of EWIS Installed in the Pressurized Zone Between Wing Center Box Main Gear Well and Cabin Floor (Only Contaminated EWIS)			713	ALL
R	Cleaning of PDU Supply EWIS Installed in Bay under AFT Cargo Compartment (Only Contaminated EWIS)			716	ALL
R	Cleaning of EWIS Installed in Flight Compartment (Only Contaminated EWIS			718	ALL
R	Cleaning of G, E and P Routes Within FWD Main Deck Utility Overhead Compartment (Only Contaminated EWIS)			721	ALL
R	Cleaning of All EWIS Installed in FWD Main Deck Compartment (Only Contaminated EWIS)			724	ALL
R	Cleaning of All EWIS Installed in FWD Main Deck Overhead Compartment (Only Contaminated EWIS)			728	ALL
R	Cleaning of All EWIS Installed in Center Main Deck Compartment (Only Contaminated EWIS)			731	ALL
R	Cleaning of All EWIS Installed in the Center Main Deck Overhead Compartment (Only Contaminated EWIS)			734	ALL
R	Cleaning of All EWIS Installed in			737	ALL

	SUBJECT	CH/SE/SU	C	PAGE	EFFECTIVITY
	Aft Main Deck Compartment (Only Contaminated EWIS)				
R	Cleaning of All EWIS Installed in the Aft Main Deck Overhead Compartment (Only Contaminated EWIS)			740	ALL
R	Cleaning of All EWIS Installed in Aft Main Deck Utility Areas (Only Contaminated EWIS)			743	ALL
R	Cleaning of All EWIS Installed in Aft Main Deck Utility Overhead Compartment (Only Contaminated EWIS)			746	ALL
R	Cleaning of All Power Feeder EWIS Installed in APU and Accessory Compartment (Only Contaminated EWIS)			749	ALL

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1. General (Ref. Fig. 001, 002)

A. Generation

The aircraft electrical power is normally supplied in flight by two integrated drive generators (IDG) ; each of them is driven by one engine.
A third auxiliary generator driven by the APU can replace either main generator.
The generators supply the alternating current distribution network.
Three transformer rectifiers supply the direct current distribution network. In the event of a major failure, a standby generator or three batteries and a static inverter enable supply of the services required for aircraft control.
On ground, the A/C can be supplied by an electrical ground power control unit. Independent power supply is also possible from the auxiliary generator.
The aircraft electrical network comprises :
- A 115/200 Volt 400 Hz three-phase AC network,
- A 115 Volt 400 Hz single-phase AC network,
- A 26 Volt 400 Hz single-phase AC network,
- A 28 Volt DC network.

B. Distribution Network General Arrangement

In normal flight configuration each IDG supplies its own distribution network via its generator line contactor (GLC). The two IDG's are never electrically coupled.
The distribution network No. 1 consists of :
- The No. 1 alternating current bus (AC BUS 1).
  The alternating current essential bus (AC ESS BUS).
- The alternating current emergency bus (AC EMER BUS).

The distribution network No. 2 corresponds to the alternating current bus No. 2 (AC BUS 2).
The transformer/rectifiers 1 and 2 supplied by BUSSES 1 and 2 respectively supply the direct current normal bus (DC NORM BUS) through their respective contactors.

R The essential transformer rectifier supplied from the alternating current essential bus, supplies the direct current essential bus (DC ESS BUS) through its contactor.
The direct current normal and essential busses are linked by a tie contactor (DC BUS TIE).
The distribution network of the standby generator consists of :
- a part of the alternating current essential bus (AC ESS BUS 3XP-2)
- the alternating current emergency bus (AC EMER BUS)
- the direct current essential bus (DC ESS BUS).

The three batteries are associated with the direct current essential bus, (DC ESS BUS).
In certain failure configurations, the following power supplies are provided :
- the alternating current essential bus (AC ESS BUS) and the associated emergency bus (AC EMER BUS) can be directly supplied via a main

generator, upstream of its line contactor and through the corresponding essential transfer contactor (ETC).

R This possibility is mostly used in emergency configuration.

- the alternating current emergency bus (AC EMER BUS) can be supplied :
  . either by the standby generator through part of the alternating current essential bus 3XP-2
  . or directly by the static inverter.

These possibilities are mostly used in smoke emergency configuration.

2. Alternating Current Generation and Distribution (Ref. Fig. 002) (Ref. Fig. 003)

A. Generation

(1)Generator Drive

The three aircraft generators are driven at constant speed, so that the distribution network can be supplied with a fixed frequency.
Each engine generator is driven by means of an integrated hydromechanical speed regulator (IDG : Integrated Drive Generator).

The auxiliary generator is directly driven at constant speed by the APU.
In the event of mechanical failure, an IDG can be disconnected by means of a PUSH to DISC IDG pushbutton protected by a guard and located on ELEC PWR panel on overhead panel.
It is to be noted that the disconnection mechanism can be reset only on ground with engine shut down.
It cannot be activated with engine not running.

(2)Generator and Generator Control Unit

Each generator delivering 3 - phase 115/200 VAC/400 Hz voltage is controlled by means of the GEN pushbutton switch located on ELEC PWR panel on flight compartment overhead panel and via a generator control Unit (GCU).
The GCU main functions are :

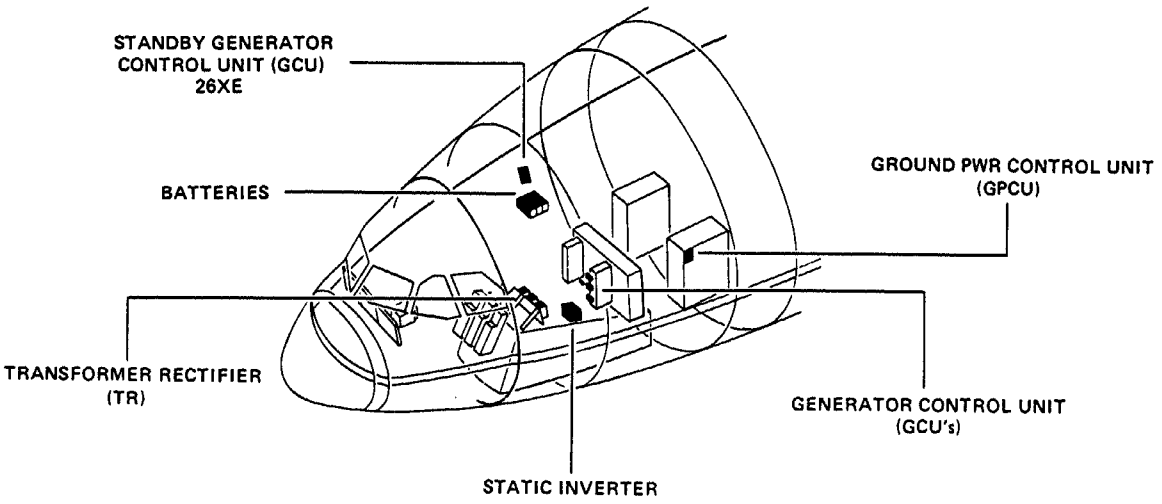
- to control the generator voltage by regulating the exitation current
- to protect the network and the generator by controlling the associated line contactor and generator energization.
- to control the warnings associated with the corresponding channel.

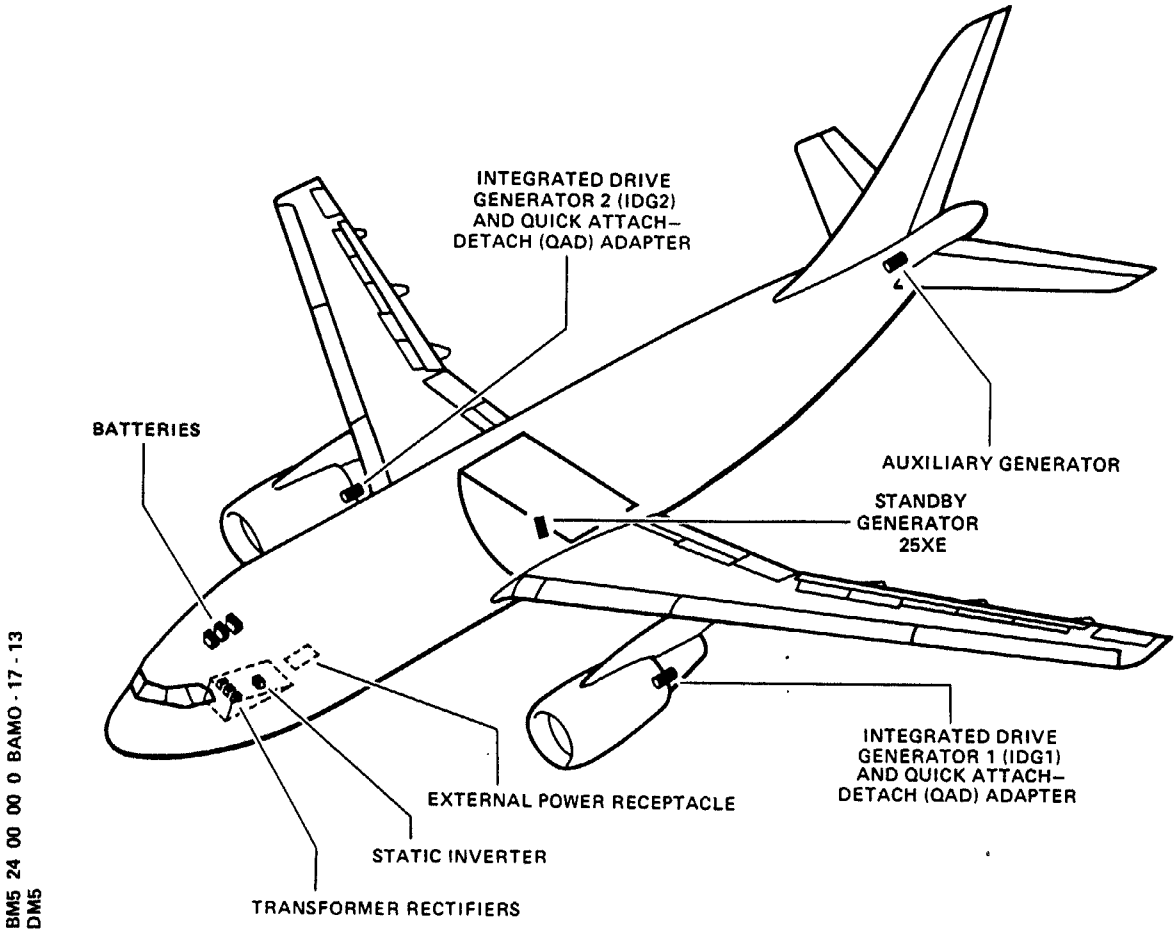
Further to triggering of a protection device (except differential protection) it is possible to reset the system by pressing to release the GEN pushbutton switch (OFF/R selection).
Each GCU includes an integrated test and self monitoring system which analyses most of the defects affecting the channel and memorizes the corresponding data in a non-volatile memory, via the ground power control unit (GPCU).

(3)Static inverter

The static inverter transforms the direct current voltage (28VDC) from the essential bus (DC ESS BUS) into a single phase (115V 400Hz) alternating current.
The static inverter starts automatically in the event of AC essential bus loss to supply the emergency bus (AC EMER BUS).

(4)Standby generator and generator control unit (GCU)




INTEGRATED DRIVE GENERATOR 2 (IDG2) AND QUICK ATTACH-DETACH (QAD) ADAPTER
BATTERIES
AUXILIARY GENERATOR
STANDBY GENERATOR 25XE
INTEGRATED DRIVE GENERATOR 1 (IDG1) AND QUICK ATTACH-DETACH (QAD) ADAPTER
EXTERNAL POWER RECEPTACLE
STATIC INVERTER
TRANSFORMER RECTIFIERS

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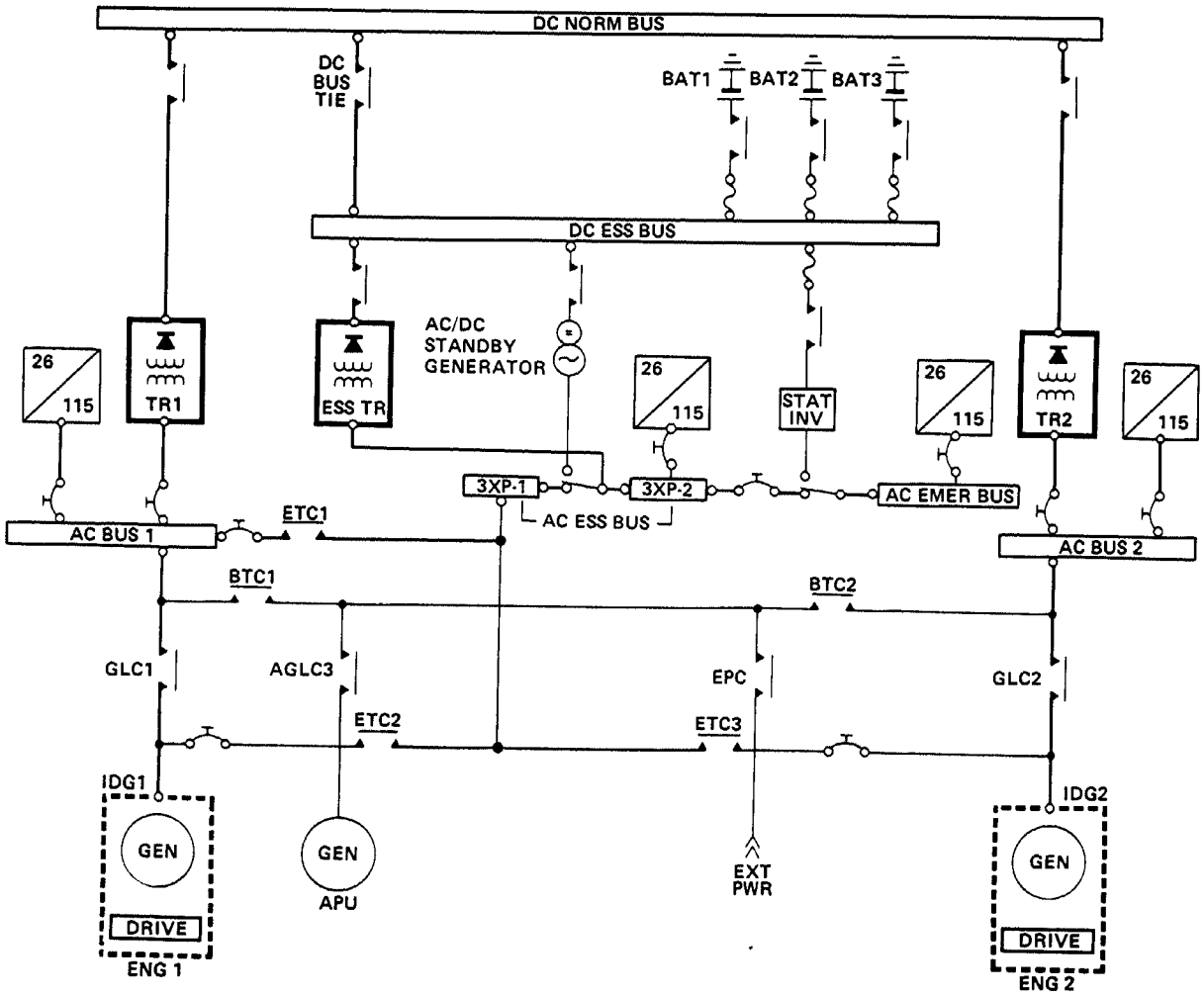
Electrical Power - Component Location
Figure 001



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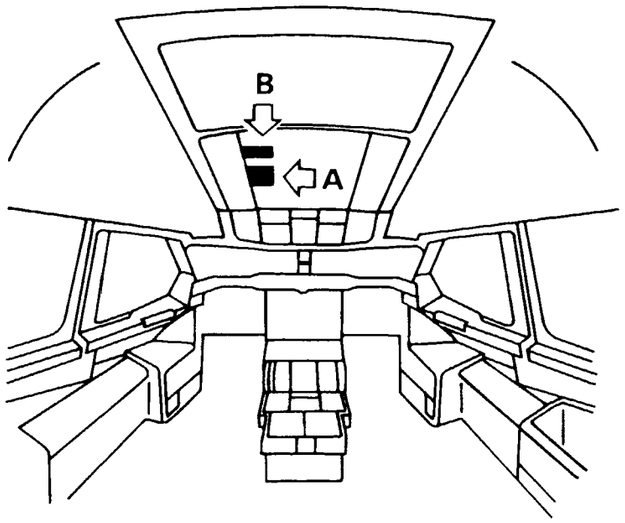
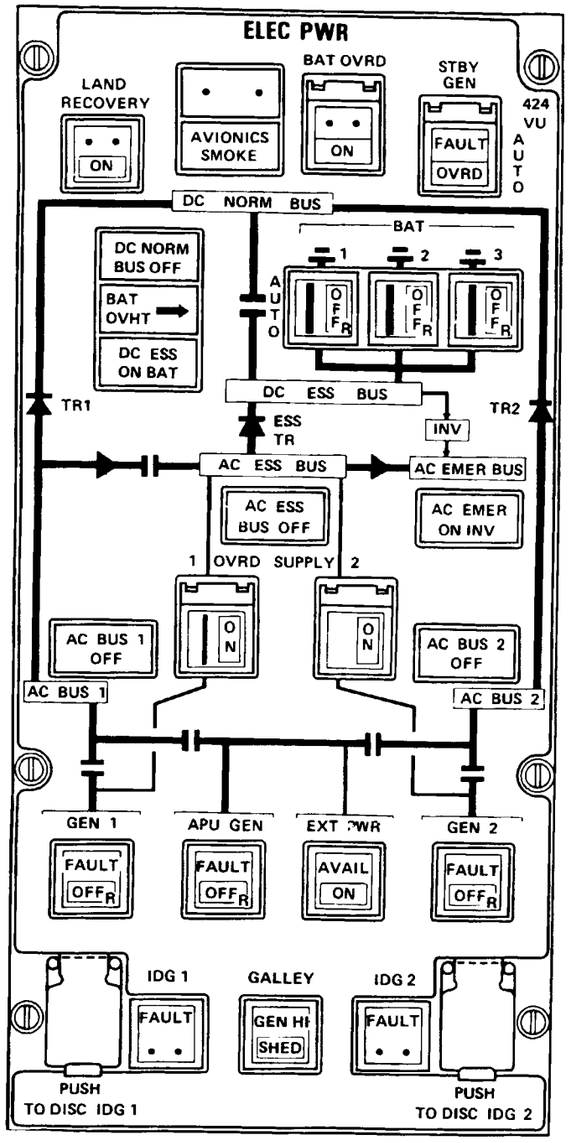
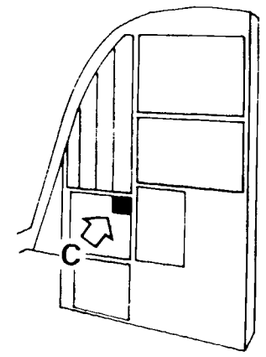
Electrical Power - General Distribution
Figure 002

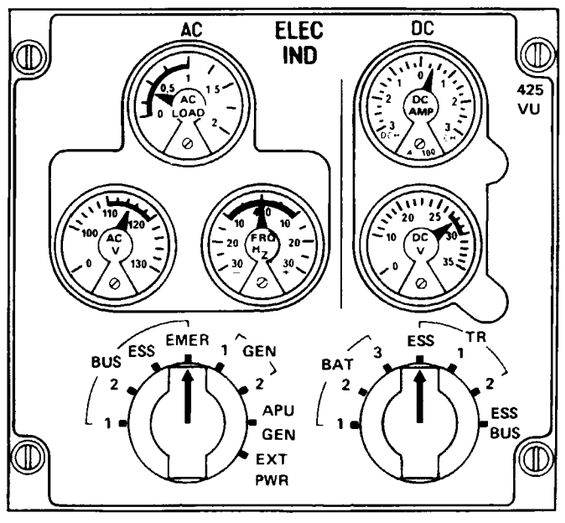


A





B



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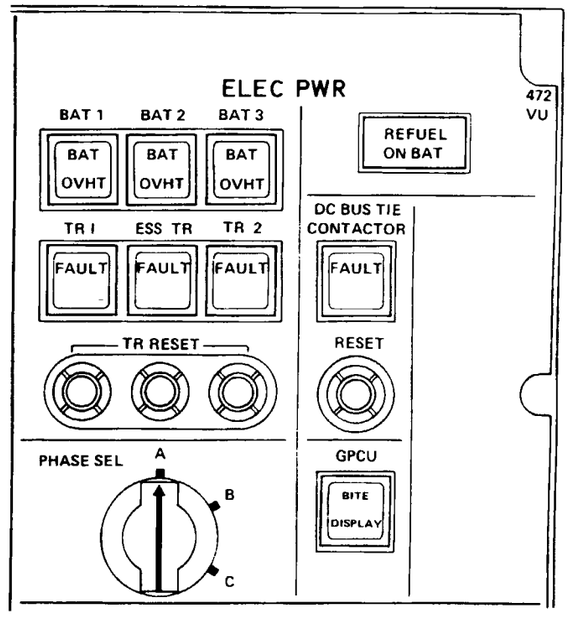

Electrical Power - Control and Indicating
Figure 003

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The standby generator is driven by a hydraulic motor powered by the Green hydraulic system, the whole forming a single assembly.
Its nominal alternating current 3-phase power under 115 v is 5 Kva and direct current power under 28 v is 50A.
The generator is controlled and protected by a generator control unit (GCU) which provides alternating current and frequency regulations.
The standby generator starts automatically in the event of loss of both main generation sources or of the auxiliary generation to supply the essential buses (AC ESS BUS 3XP-2), the alternating current emergency bus (AC EMER BUS) and the direct current essential bus (DC ESS BUS).

B. Transfer Circuit

The transfer circuit enables supply of both or either AC electrical network (S) from one of the four power sources (GEN 1, GEN 2, APU GEN, EXT PWR) via the transfer contactors (BTC). The BTC control is entirely automatic and depends only on the availability of these sources.
The BTC No. 1 closes
- when the generator is not available, in order to supply network 1 from another power source (generator 2, auxiliary generator or ground power unit).
- to supply network 2 from generator 1, if generator 2, auxiliary generator and electrical ground power unit are not available.

BTC No.2 control is symmetrical.
Networks 1 and 2 are supplied in priority order :
- by the corresponding generator
- by the electrical ground power unit
- by the auxiliary generator
- or by the other generator.

NOTE : The BTC is locked out when a DP fault exists in zone 2 in order to isolate the faulty section of the circuit.

C. Distribution

The alternating current distribution network can be divided into two independent parts.
Network No. 1 comprises normal bus 1 (AC BUS 1) essential bus (AC ESS BUS) and emergency bus (AC EMER BUS).
These three busses are supplied in series. The normal 1 and essential busses are three phase 115 V/400 Hz busses.
The emergency bus is a single phase 115 V/400 Hz bus.
Network No. 2 includes normal bus 2 (AC BUS 2) which is a three phase 115 V/400 Hz bus.
Each above mentioned bus also delivers 26 V/400 Hz power supply through 115/26 V transformer.
In the event of normal bus 1 loss, the essential bus can be manually recovered by transfering power supply directly from generator 1 or 2 through the ETC 2 or 3.
Transfer is effected by pressing OVRD SUPPLY 1 or 2 pushbutton switch under the corresponding guard located on ELEC PWR panel on overhead panel.
It is to be noted that both OVRD SUPPLY pushbutton switches have a specific function during the smoke emergency procedure.

NOTE : Part of this network can be supplied independently and directly via

the external ground receptacle to carry out ground service operations.

3. Direct Current Generation and Distribution
(Ref. Fig. 002, 003)

A. Direct current is generated by three identical tranformer rectifiers or by the AC/DC generator standby or by three identical batteries.

(1)Transformer rectifier

Each transformer rectifier transforms the three phase alternating current into direct current.

As soon as it is energized, the transformer rectifier operates and supplies the direct current network via a contactor controlled by a current sensor.

This sensor, the function of which is to protect the network and the TR, controls the contactor opening in the event of :

- high reverse current (short circuit) in the distribution bus to TR direction or TR overheat.

In a normal operating DC power system, a wide dispersion between the transformer rectifiers output currents can be observed, but as long
R as no warning is triggered, the system operates within its design limits.

(2)Batteries

They are used to :

- supply the essential network in emergency configuration
- to start the APU in flight and on ground.

Each battery is controlled from the ELEC PWR panel on flight compartment overhead panel by BAT pushbutton switch and via a battery charge controller which enables :

- battery charge control by coupling the battery to the network or uncoupling it from the network
- battery charge monitoring and detection of thermal runaway at its early stage
- control of line connection to battery power to recover the essential network in the event of normal supply loss.

The three batteries can be connected to the line either :

- automatically,
  . at the beginning of the APU starting sequence.
  . when both automatic pilot systems are selected in LAND mode
- or manually, when BAT OVRD pushbutton switch located on ELEC PWR panel on flight compartment overhead panel is pressed.

(3)Standby generator

The standby generator is used to supply the essential network in emergency configuration.

It is automatically selected and has priority on the batteries (except at APU starting or when LAND mode is selected on both autopilots).

It enables aircraft autonomy without time limitation.

B. Distribution

The direct current distribution network mainly consists of two busses

- the normal bus (DC NORM BUS) supplied by TR's 1 and 2
- the essential bus (DC ESS BUS) supplied by the essential TR.

These two busses are connected by means of a tie contactor (DC BUS TIE) and the direct current network is supplied by the three TR's in parallel.

The tie contactor is controlled by the current sensor which enables

protection of the essential network in the event of high current detection (short-circuit) from the essential bus (DC ESS BUS) to the normal bus (DC NOM BUS).

The contactor also opens automatically in the following cases :
- when the two automatic pilots are selected in LAND mode to achieve a LAND III landing capability
- in the event of loss of the two alternating current normal busses (AC BUS 1 and 2). (Ultimate emergency and smoke emergency configurations).

NOTE : Part of the direct current normal network can be supplied independently by TR2 directly energized by the external ground receptacle.

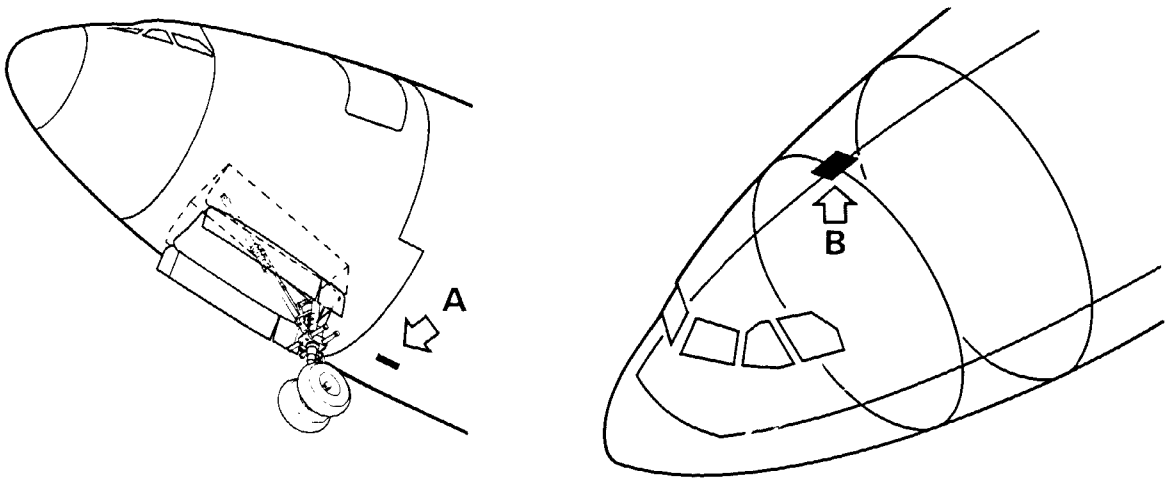
4. Power Supply via the External Ground Receptacle
(Ref. Fig. 002, 003, 004)

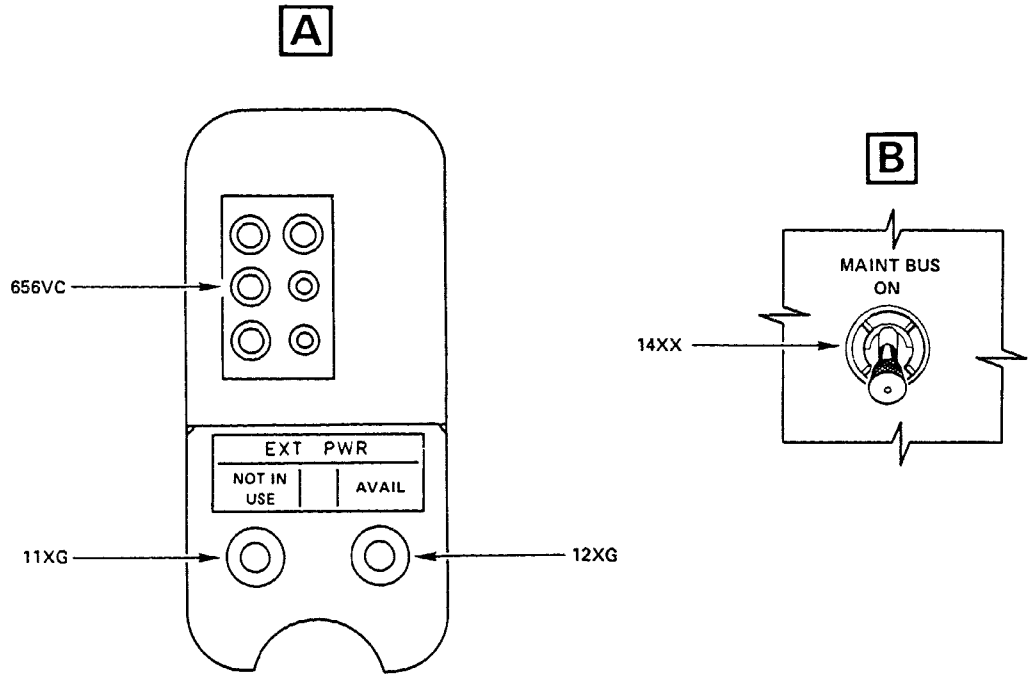
A. External Power Supply Control
An external ground receptacle located aft of the nose landing gear well enables power supply of the aircraft network by means of a 3-phase, 400 Hz, 115/200 V ground power unit.
External power supply is controlled from the ELEC PWR panel on flight compartment overhead panel and via a ground power control unit (GPCU).
The ground power control unit protects the network by controlling the external power contactor (EPC) in the event of :
- over/under voltage
- over/under frequency
  incorrect phase order.

It also includes an integrated test and self monitoring system which analyzes most of the defects which may affect the channel and memorizes the corresponding information in a non-volatile memory.
This information, as well as those memorized in the non-volatile memories of the control units (GCU) of generator 1 or 2 or auxiliary generator can be displayed, on the ground only, on an alphanumerical display window located on the front face of the GPCU.
When fault information are memorized, the GPCU activates the BITE DISPLAY GPCU memorized fault annunciator located on maintenance panel.

B. Ground/Flight and Ground Network Supply Control
It is possible to supply part of the aircraft electrical network as follows, directly from the external ground receptacle, and routed through the differential protection current transformer (DPCT) on the auxiliary channel, to carry out ground service operations :
- supply of part of the alternating current network (ground/flight busses)
- supply of part of the direct current network (ground and ground flight/busses)

without energizing the whole aircraft electrical network.
The aircraft electrical network energization is controlled from the forward panel by means of MAINT BUS switch.





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Electrical Power - EXT PWR
Figure 004

5. Controls and Indicators related to Electrical Generation and Distribution
(Ref. Fig. 003, 005)
Controls and indicators related to the aircraft electrical generation and distribution on the following panels :
- monitoring panel
- main control panel
- maintenance panel
- CAPT and F/O main instrument panels 3VU and 5VU (MASTER WARN and MASTER CAUTION) and ECAM display units are shown on referenced figure

R (Ref. Fig. 005)

A. Alternating Current Generation and Distribution

(1)Monitoring panel - ELEC IND (Item H).

(a)AC loadmeter

It indicates the load of the aircraft generator (GEN 1, GEN 2, APU GEN) selected by means of the parameter selector switch located below the loadmeter.
It is graduated in fractions of the generator nominal load.

(b)AC voltmeter

It indicates the voltage of the power source selected by means of the parameter selector switch located below the voltmeter :
- phase A voltage for the four distribution busses
- phase A, B or C voltage for the four alternating current power sources according to the position of the phase selector switch located on maintenance panel.

The white portion corresponds to a normal indication.

(c)Frequency meter

It is connected in parallel with the voltmeter and indicates the frequency of the selected source.
The white portion corresponds to a normal indication.

(d)AC parameter selector switch

It enables selection of the information given by the three above mentioned instruments :
- voltage and frequency of the four busses
- voltage, frequency and load of the three aircraft generators.
- voltage and frequency of the electrical ground power/unit.

NOTE : The frequency and voltage information of the three AC generators and the electrical ground power unit are given for the phase selected by the phase selector on the maintenance panel.

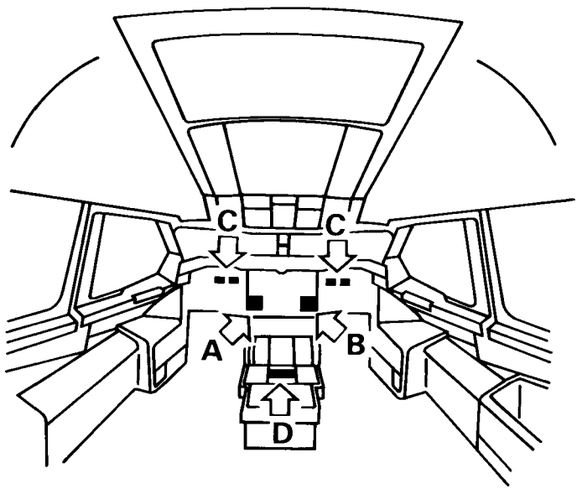
(2)Main control panel - ELEC PWR (Item G)

(a)IDG drive controls and indicators

1 PUSH TO DISC IDG pushbutton (Item 1)

This pushbutton switch, protected by a guard, controls uncoupling of the IDG from the accessory gearbox.
It is to be noted that :
- the IDG can be reset only on ground with engine shut down
- the pushbutton switch must not be pressed for more than 3 seconds to prevent damage to the control solenoid
- the pushbutton switch must not be activated when the engine is shut down to prevent damage to the disconnection mechanism.

2 IDG warning lights



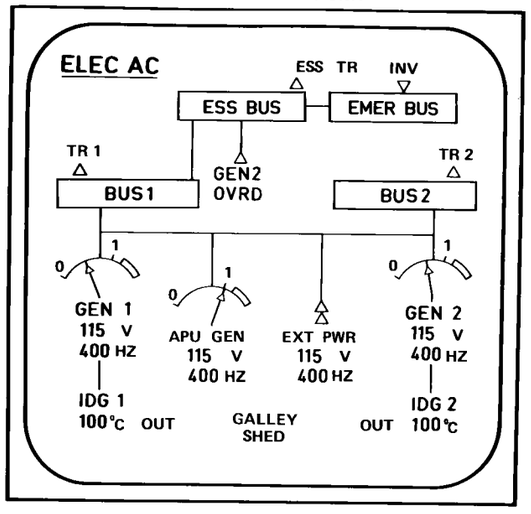
A

L ECAM DISPLAY UNIT

GEN 1 OR 2 FAULT ---------- OFF
APU GEN FAULT
APU----------AS RQRD
APU GEN----------OFF
AC ESS BUS OFF
AC BUS 1 (OR2) OFF
AC EMER BUS OFF
BAT 1 OVTH----------OFF
(OR2) R
(OR3)
DC ESS BUS ON BAT
BAT OVRD----------ON
DC NORM BUS OFF
LAND RECOVERY----------ON

B

R ECAM DISPLAY UNIT



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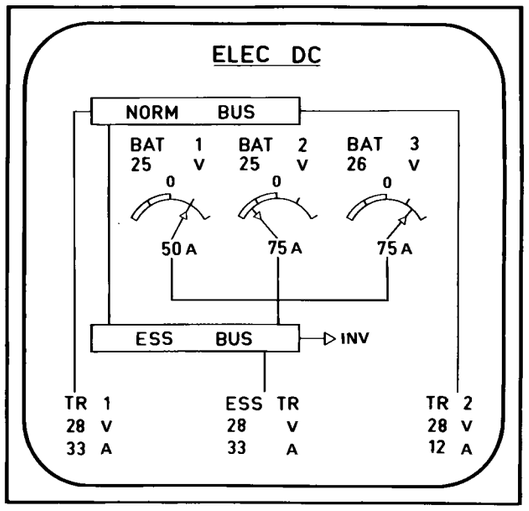
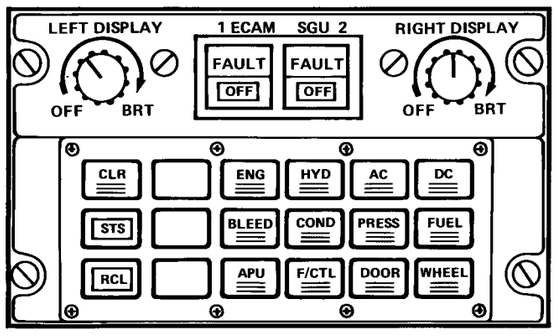


D

ECAM CONTROL PANEL



C

MASTER WARN

MASTER CAUTION

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Electrical Generation and Distribution
Controls and Indicators
Figure 005

R

EFFECTIVITY: ALL

PIA

- FAULT : this amber warning light comes on to indicate a failure by :
  . oil overheat at IDG oil outlet.
  . low oil pressure drop with engine running.
  FAULT warning light illumination is repeated on ECAM display unit.

NOTE : The warning light goes off as soon as the IDG is effectively disconnected from the drive shaft.

(b)Alternating current generation and transfer circuit

1 GEN 1 (2) pushbutton switch

This pushbutton switch is used to connect the IDG to the line when driven by its motor

- On : (pushbutton pressed) The generator is energized and if its electrical parameters are correct, its line contactor closes to supply the corresponding network.
- OFF/R : (pushbutton released) The generator is disconnected, no longer excited and the line contactor open.
  The white OFF/R legend comes on to indicate the pushbutton position.
- FAULT : The FAULT amber legend comes on when the pushbutton switch is pressed :
  . in case of a protection trip controlled by the GCU.
  In this case the line contactor opens automatically.
  . if the line contactor is open. (Except if ON is selected on both OVRD SUPPLY 1 and 2 pushbutton switch).

NOTE : This warning is inhibited :
. if OFF/R is selected
. if both OVRD SUPPLY pushbutton switches 1 and 2 are selected ON.

2 APU GEN pushbutton switch

This pushbutton switch is used to connect the auxiliary generator to the line when the APU operates :

- pushbutton switch pressed. The generator is excited and if electrical parameters are correct, its line contactor closes to supply the transfer circuit.

NOTE : On ground, the line contactor closes only if the electrical ground power unit does not supply the aircraft. Priority supply is by the electrical ground power unit.
. The APU generator supplies the aircraft network according to the transfer contactor position which mainly depends on the availability of the main generators.

- pushbutton switch released (OFF/R selected) ; the generator is cut off, no longer excited and the line contactor is open.
  The white OFF/R legend comes on to indicate the pushbutton switch position.
- FAULT warning :
  The FAULT amber legend comes on if :
  . a protection is triggered by the GCU, in this case the line contactor opens automatically
  . the line contactor is open (except if the ground power unit energizes the aircraft electrical network.

NOTE : This warning is inhibited :

. if **OFF/R** is selected
. or if the **APU** drive speed is too low :

(c)Alternating current distribution

1 **AC BUS 1 (2) OFF** warning light
The **AC BUS 1 (2) OFF** warning light comes on to indicate that the corresponding bus is not supplied.

2 **AC ESS BUS OFF** warning light
The **AC ESS BUS OFF** warning light comes on to indicate that the bus is not supplied.

3 **AC EMER ON INV** indicator light
The **AC EMER ON INV** blue indicator light comes on to indicate that the bus is supplied by the static inverter.

4 **OVRD SUPPLY 1 (2)** pushbutton switch
These two pushbutton switches control power supply to the **ESS TR** and essential busses **(AC ESS BUS)** and associated emergency bus **(AC EMER BUS)**

- pushbutton switch released (off). The **TR** and essential busses are supplied by normal bus **1 (AC BUS 1)**. This corresponds to the normal supply configuration.
- pushbutton switch pressed (on). The **ON** legend comes on to indicate the pushbutton switch position.
  The flowbar which provides continuity of the synoptic diagram on panel indicates that the contactor is closed.

5 **GALLEY** pushbutton switch
This pushbutton switch controls power supply of :
. main galleys
. secondary galleys.

- On (pushbutton switch pressed). This position is normally latched ; the galley power supply depends of the aircraft configuration and power supply availability.
  . on ground, the main and secondary galleys can be supplied by the electrical ground power unit or the auxiliary generator.
  . all the galleys can be supplied in flight.
- **SHED** : (pushbutton switch released)
  The white **SHED** legend comes on to indicate the pushbutton switch position. The galley power supply is cut off.
- **GEN HI** : The **GEN HI** amber legend comes on to indicate an overload detected on one of the three generators.

6 **STBY GEN** pushbutton switch
This pushbutton switch controls the operation of the standby generator :

- **AUTO** : the pushbutton switch is released (out) : standby generator coupling and uncoupling are automatically controlled.
- **OVRD** : the pushbutton switch is pressed (in) : the standby generator is manually started, the **OVRD** legend comes on white.

The **FAULT** legend on the **STBY GEN** pushbutton switch comes on amber to indicate failure of the stanbby generator operation.

(3)**ELEC PWR (Item B)** maintenance panel

(a)Phase selector
It enables selection of the phase for the indications displayed on voltmeter and frequency meter on flight compartment overhead panel and

related to generators 1, 2 and auxiliary generator or electrical ground power unit.

(b)**GPCU BITE DISPLAY** memorized fault annunciator

When this annunciator comes on, it indicates that a fault is detected on any channel of generator 1, 2, **APU**, or electrical ground power unit and that the corresponding information has been stored in the non-volatile memory of the corresponding **GCU** or **GPCU**.

This information can be displayed on the display window located on the front face of the **GPCU**.

B. Direct Current Generation and Distribution

(1)**ELEC IND** monitoring panel

(a)**DC** ammeter

It indicates :

- transformers/rectifiers charge
- the charge/discharge current for the batteries.

with respect to the position of the selector switch located at the lower part.

(b)**DC** voltmeter

It indicates the voltage of the direct current source selected by the selector switch located at the lower part :

(c)Selector switch

It is used to select the power source for which the indications are given on the indicators mentioned above :

- voltage and charge/discharge current for batteries
- voltage and charge for **TR's**
- essential bar voltage.

(2)**ELEC PWR** control panel

(a)**BAT 1 (2, 3)** pushbutton switch

This pushbutton switch controls the battery/battery charge controller assembly

- **OFF/R** the pushbutton switch is released : the battery/charge controller is not operating and the battery is uncoupled from the network. The position of this control is indicated by illumination in white of the corresponding legend.
- **AUTO** : the pushbutton switch is pressed : the battery/charge controller assembly is operating. The battery coupling and uncoupling are automatically controlled by the charge controller.
  The battery contactor position is indicated by the **LH** half of the pushbutton switch which shows continuity or discontinuity of the panel synoptic.

(b)**DC ESS ON BAT** warning light

This amber warning light comes on to indicate that the essential bus **(DC ESS BUS)** is supplied by the batteries only and that flying time is limited in this configuration.

(c)**BAT OVHT** warning light

The amber warning light comes on to indicate thermal runaway at its early stage on one of the three batteries.

The defective battery is automatically uncoupled from the network by the charge controller.

The warning light goes off when the corresponding **BAT 1 (2, 3)**

pushbutton switch is selected **OFF/R**.
This enables resetting of the detection system.

(d)**DC NORM BUS OFF** warning light
This amber warning light comes on to indicate that the bus (**DC NORM BUS**) is not supplied.

(e)**BAT OVRD** pushbutton switch
This pushbutton switch overrides **BAT 1, 2** and **3** pushbutton switches
- **ON** (pushbutton switch pressed)
The three batteries are coupled to the network. The three charge controllers are inhibited.
The **ON** white legend comes on to indicate the pushbutton switch position.
NOTE : This control is used only in emergency configuration.
When this control is activated, the three thermal runaway detectors are inhibited.
- **OFF** (pushbutton switch released)
The three controls **BAT 1, 2** and **3** are operational.

(3)**ELEC PWR** (Item **B**) maintenance panel

(a)**REFUEL ON BAT** light
This white light comes on to indicate that the refuel system is supplied with battery **1**.

(b)**DC BUS TIE CONTACTOR FAULT**
Fault memorized annunciator.
When it comes on, it indicates that the **DC** bus tie contactor has opened in abnormal conditions. This can happen when high current (short circuit) is detected from the essential bus (**DC ESS BUS**) to the normal bus (**DC NORM BUS**).

(c)**DC BUS TIE CONTACTOR** reset pushbutton
This pushbutton enables resetting of the current sensor which controls the contactor after fault detection. It is also used to reset the **FAULT** memorized annunciator.

(d)**BAT OVHT (1, 2, 3)** fault memorized annunciators
Each of them indicates that thermal runaway at its early stage has been detected on the corresponding battery by the associated charge controller.

(e)**TR FAULT (1, 2, ESS)** fault memorized annunciators
When illuminated, each of them indicates that the corresponding **TR** delivers no power to the network. This can happen when the associated contactor is open.
NOTE : This contactor controlled by a current sensor opens when high current (short-circuit) is detected in the distribution bus to **TR** direction or in the event of **TR** overheat.

(f)**TR (1, 2, ESS)** reset pushbutton
Each of these pushbuttons enables reset of the corresponding current sensor, when a fault has been detected.
It also resets the associated memorized fault annunciator.

C. External Power Supply

(1)**ELEC PWR** control panel (Item **A**)

(a)**EXT PWR** pushbutton switch

This pushbutton switch is used to control the aircraft power supply from an electrical ground power unit when :
. the ground power unit is connected to the ground power receptacle,
. power supply is correct.

- **ON** (pushbutton switch pressed)
  This position is latched if the electrical parameters are correct.
  The **ON** Blue legend comes on to indicate that the contactor is closed and that the electrical ground power unit can supply the aircraft network via the transfer contactor.
  NOTE : If the aircraft was previously supplied by the auxiliary generator, the later is automatically cut off.
  The ground power unit has priority.
  The transfer contactor position depends on the main generator position.
- Off (pushbutton released)
  The ground power unit contactor is open and the **ON** legend is Off.
  NOTE : Nevertheless if the ground power unit is available, it can supply the ground and ground/flight networks.
  AVAIL green legend comes on to indicate that the ground power unit is connected to the ground power receptacle and that the ground power unit electrical parameters are correct.
  It goes off when the **EXT PWR** pushbutton switch is pressed.

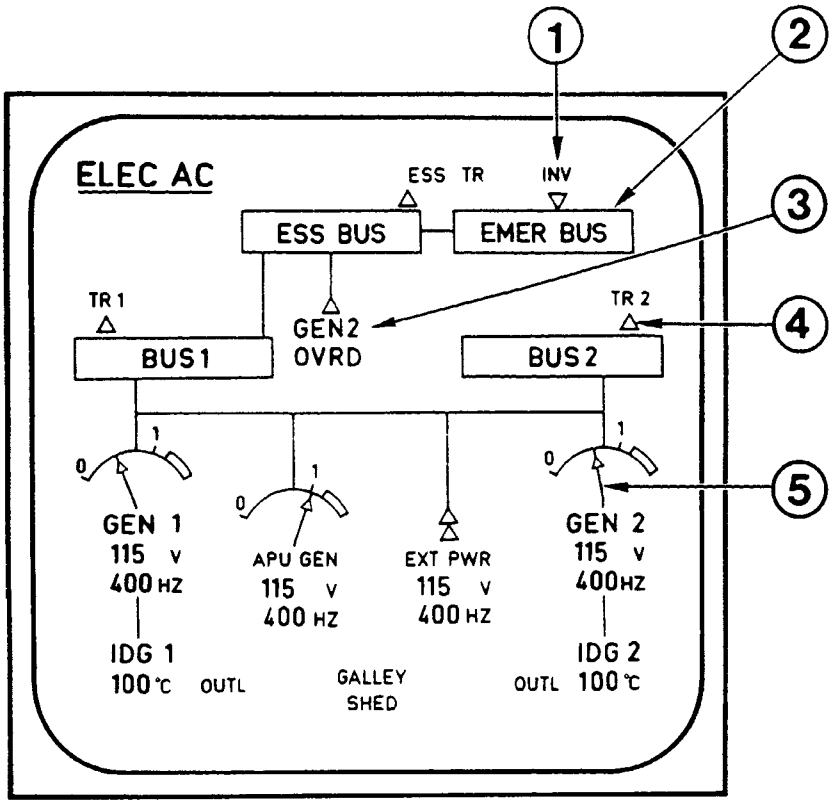
(2)**MAIN/BUS** control switch (Item A)
This switch located on forward panel is used to control power supply of the **AC** and **DC** ground/flight and ground networks.
- either from the aircraft network
- or from the ground power receptacle.

This selection enables supply of part of the aircraft network ; it is not necessary to energize the whole aircraft network.
ON : The switch is self-maintained if the ground power unit is available and the electrical parameters are correct.
OFF : This network is supplied by the main aircraft network.

D. **ECAM** System
All warnings related to the electrical system are centralized in the flight compartment and displayed on the **ECAM** display units.
Detected failure is indicated by :
- an aural warning
- **MASTER CAUTION** light flashing on **CAPT** and **F/O** main instrument panels **3VU** and **5VU**.

Warnings are available on :
- **CAPT** and **F/O** main instrument panels **3VU** and **5VU** (Item C).
- the left **ECAM** display unit (Item A)
- the right **ECAM** display unit (Item B).

Status of the **ELEC** system can be displayed by pressing **AC** of **DC** pushbutton switch on the **ECAM** control panel (Item D) (ECAM SGU).
(1)The synoptic view of the electrical generation and distribution appear on the **ECAM** display unit (Ref. Fig. 006, 007, 008)
(Ref. Fig. 009)
(2)The various inputs related to **ELEC** message on left **ECAM** display unit are given in the corresponding figures



1 - EMERGENCY INVERTER (W)
2 - EMERGENCY BUS (G)
3 - GENERATOR 1 OR 2 OVERRIDES AC BUS 1
- GEN 1 OVRD (W) : GENERATOR 1 SUPPLIES AC ESS BUS
- GEN 2 OVRD (W) : GENERATOR 2 SUPPLIES AC ESS BUS
- GEN OVRD (W) : NO OVERRIDE

4 - AC BUS AND TRANSFORMER RECTIFIER

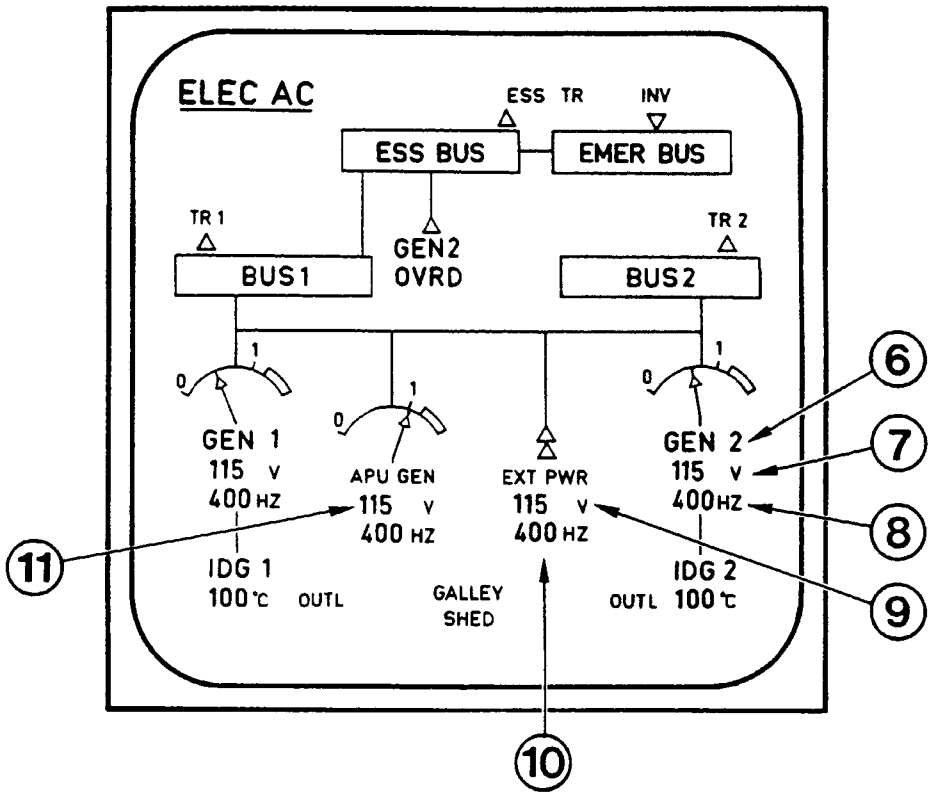
TR 2 (W) / TR 2 (G) / BUS 2	(G)	WHEN SUPPLIED
TR 2 (A) / TR 2 (A) / BUS 2	(A)	WHEN NOT SUPPLIED

5 - GENERATOR LOAD (G)
(A) WHEN LOAD ≥ 110%
NOT DISPLAYED WHEN GEN P/BSW IS SELECTED OFF/R

BM5 24 00 00 0 ARM0 00

ELEC AC ECAM DISPLAY UNIT
Figure 006

R



6 - GEN 2 (W)
(A) WHEN GEN P/BSW IS SELECTED OFF/R

7 - GENERATOR VOLTAGE (G)
(A) WHEN VOLTAGE ≤ 110V
≥ 120V
OFF (W) REPLACES VOLTAGE INDICATION WHEN GEN P/BSW IS SELECTED OFF/R.

8 - GENERATOR FREQUENCY (G)
(A) WHEN FREQUENCY ≤ 390 HZ
≥ 410 HZ
NOT DISPLAYED WHEN GEN P/BSW IS SELECTED OFF/R

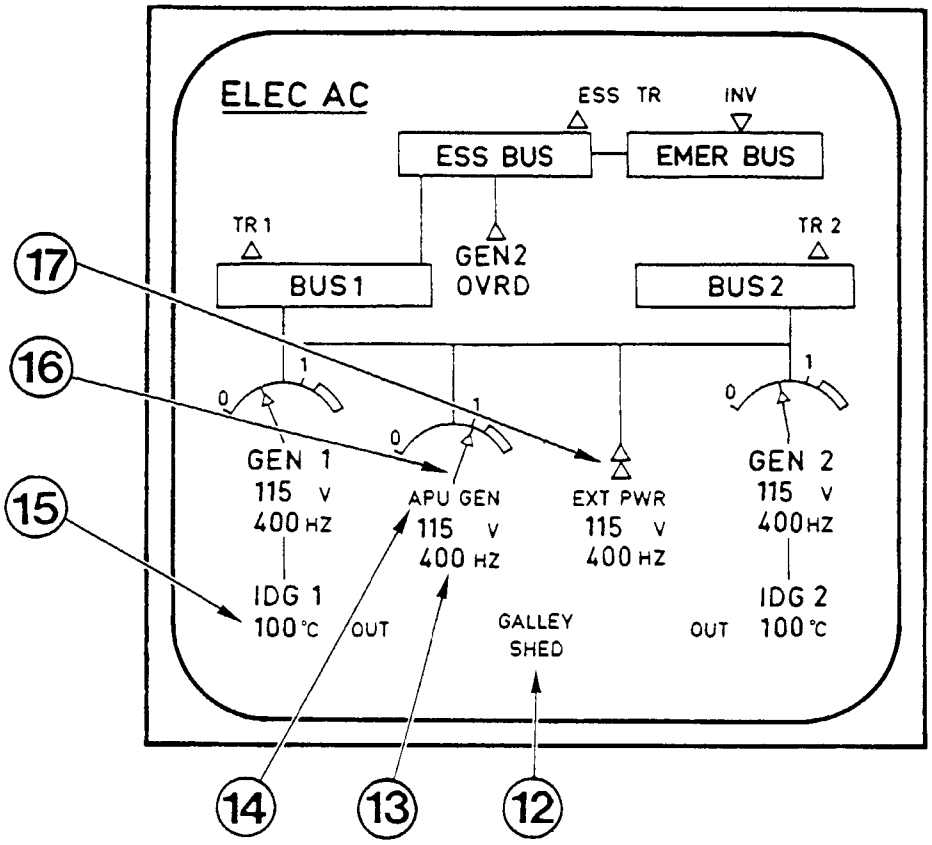
9 - EXTERNAL POWER VOLTAGE (G)
(A) WHEN VOLTAGE ≤ 110V
≥ 120V
NOT DISPLAYED WHEN EXTERNAL POWER VOLTAGE ≤ 50V

10 - EXTERNAL POWER FREQUENCY (G)
(A) WHEN FREQUENCY ≤ 390 HZ
≥ 410 HZ
NOT DISPLAYED WHEN EXTERNAL POWER VOLTAGE ≤ 50V

11 - APU GENERATOR VOLTAGE (G)
(A) WHEN VOLTAGE ≤ 110V
≥ 120V
OFF (W) REPLACES VOLTAGE INDICATION WHEN APU GEN P/BSW.
IS SELECTED OFF/R
NOT DISPLAYED WHEN APU MASTER SW IS IN OFF POSITION

BM5 24 00 00 0 AQM0 00

R ELEC AC ECAM DISPLAY UNIT
Figure 007



12 - GALLEY SHED (NOT DISPLAYED IN NORMAL OPERATION)
(W) WHEN SHED

13 - APU GENERATOR FREQUENCY (G)
(A) WHEN FREQUENCY ⩽ 390 HZ
⩾ 416 HZ
NOT DISPLAYED WHEN APU MASTER SW IS IN OFF POSITION
OR APU GEN P/BSW IS SELECTED OFF/R

14 - APU GEN (W)
(A) WHEN APU GEN P/BSW IS SELECTED OFF/R AND
APU MASTER SW IS IN ON POSITION

15 - IDG OUTLET OIL TEMPERATURE (G)
FLASHES WHEN $t^{o} \geqslant 142^{o}$ C
(A) WHEN $t^{o} \geqslant 185^{o}$ C

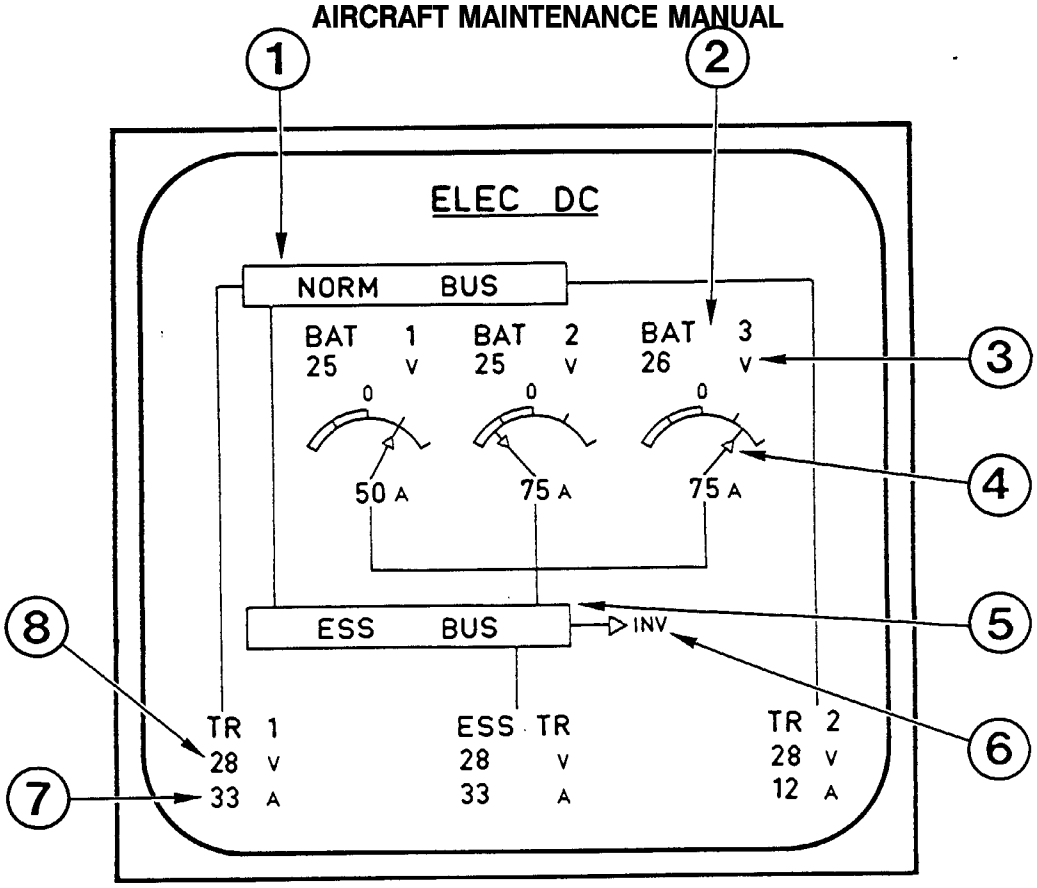
16 - APU GENERATOR LOAD (G)
(A) WHEN LOAD ⩾ 110%
Δ (W) REPLACES LOAD INDICATION WHEN
APU MASTER SWITCH IS IN OFF POSITION OR
APU GEN P/BSW IS SELECTED OFF/R

17 - EXT PWR AND Δ (W) NOT DISPLAYED IN FLIGHT
Δ

BM5 24 00 00 0 AUM0 01

R

ELEC AC ECAM DISPLAY UNIT
Figure 008



1 - NORMAL BUS

NORM BUS (G) WHEN SUPPLIED

NORM BUS (A) WHEN NOT SUPPLIED

2 - BAT 3 (W)
(A) WHEN BAT P/BSW IS SELECTED OFF/R

3 - BATTERY VOLTAGE (G)
(A) WHEN VOLTAGE ⩽ 25 V
⩾ 31 V

4 - BATTERY CURRENT (G)

(A) WHEN CURRENT < −5A
OFF (W) REPLACES DIGITAL INDICATION
WHEN BAT P/BSW IS SELECTED OFF/R

5 - ESSENTIAL BUS

ESS BUS (G) WHEN SUPPLIED

ESS BUS (A) WHEN NOT SUPPLIED

6 - EMERGENCY INVERTER (W)

7 - TRANSFORMER RECTIFIER CURRENT (G) : FLASHES WHEN ⩽ 6A

8 - TRANSFORMER RECTIFIER VOLTAGE (G)
(A) : VOLTAGE ⩽ 25 V
⩾ 31 V

BM5 24 00 00 0 AKMO - 07 - 02
DM5

ELEC DC ECAM DISPLAY UNIT
Figure 009

(Ref. Fig. 010, 011, 012)

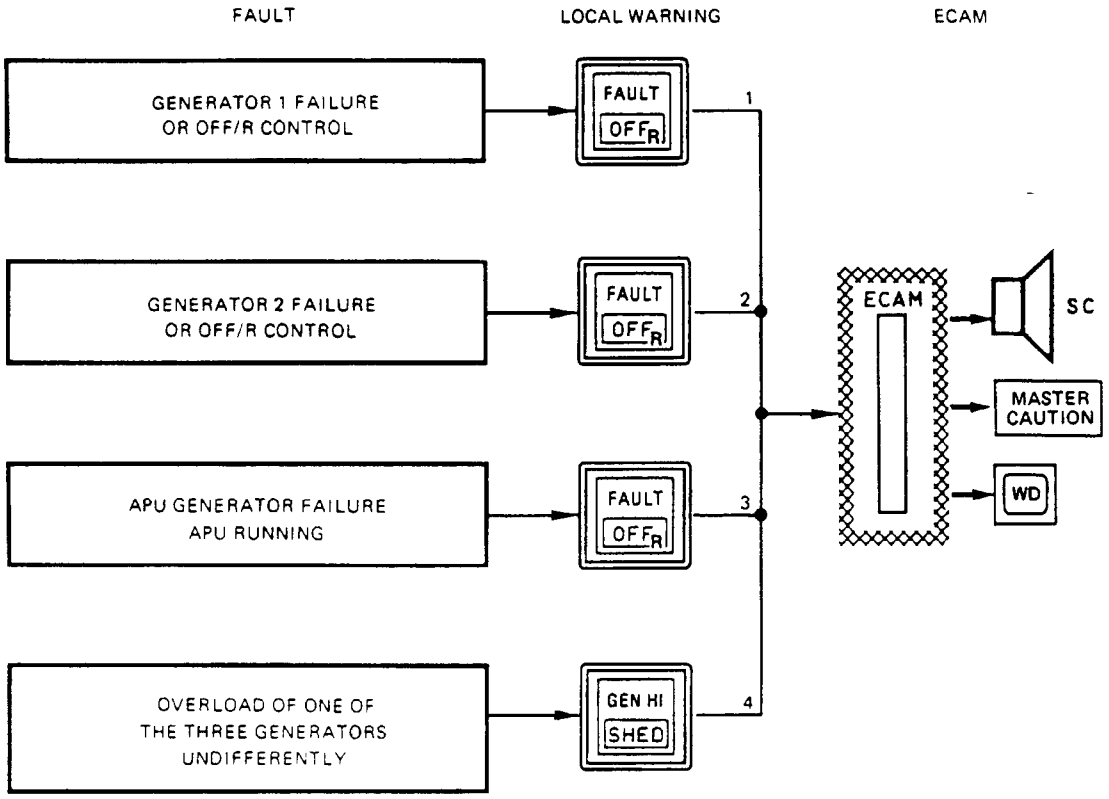
E. Circuit Breakers
(Ref. Fig. 010)
The circuit breakers of the electrical generation are located :
(1)In flight compartment :
- on overhead panel 22VU (Item A)
- on circuit breaker panel 133VU (Item B).
(2)In avionics compartment :
- on panel 106VU (Item C)
- on panel 281VU (Item D)
- on panel 101VU (Item E).

6. Procedure to be Applied in Case of "Electrical" Smoke Detection
Smoke detector location is shown in figure (Ref. Fig. 013) with respect to monitored equipment.
Any smoke detection of electrical origin causes illumination of one of the two red warning lights : **AVIONICS SMOKE, SMOKE.**

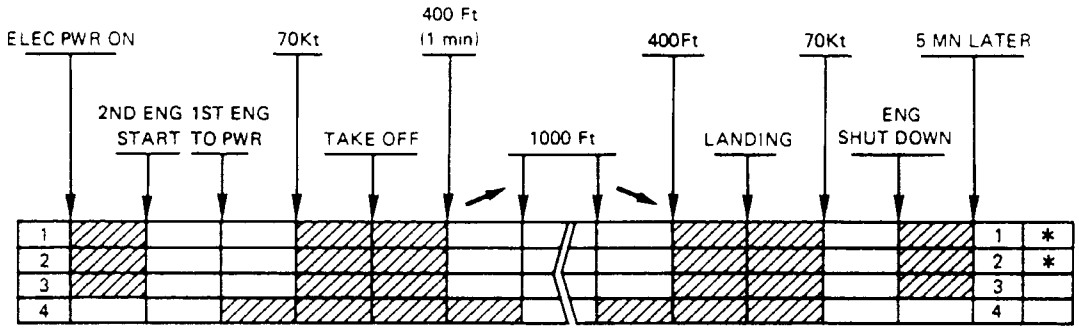
A. Smoke Emergency Procedure
This procedure is to be applied if :
- smoke of electrical origin is indicated by the illumination of **AVIONICS SMOKE** warning light located on **ELEC PWR** panel and activation of the **ECAM** system
- smoke is also confirmed by the olfactory device, the sniffer fan.

It consists in isolating most of the equipment by pressing in **OVRD SUPPLY 1** and **OVRD SUPPLY 2** pushbutton switches on **ELEC PWR** panel.
At landing, part of the equipment which have been shedded are recovered by pressing **LAND RECOVERY** pushbutton switch located on **ELEC PWR** panel.

B. Procedure Applied in Case of Smoke in the Minimum Equipment Bay
(Ref. Fig. 014)
This procedure is to be applied if smoke in minimum equipment bay is indicated by illumination of **SMOKE** warning light located on panel 22VU, at level of **MINIMUM EQUIPMENT BAY** supply circuit breakers, and confirmed by the sniffer fan.
The procedure consists in opening the **MINIMUM EQUIPMENT BAY** supply circuit breakers so that all the equipment of the compartment are isolated.



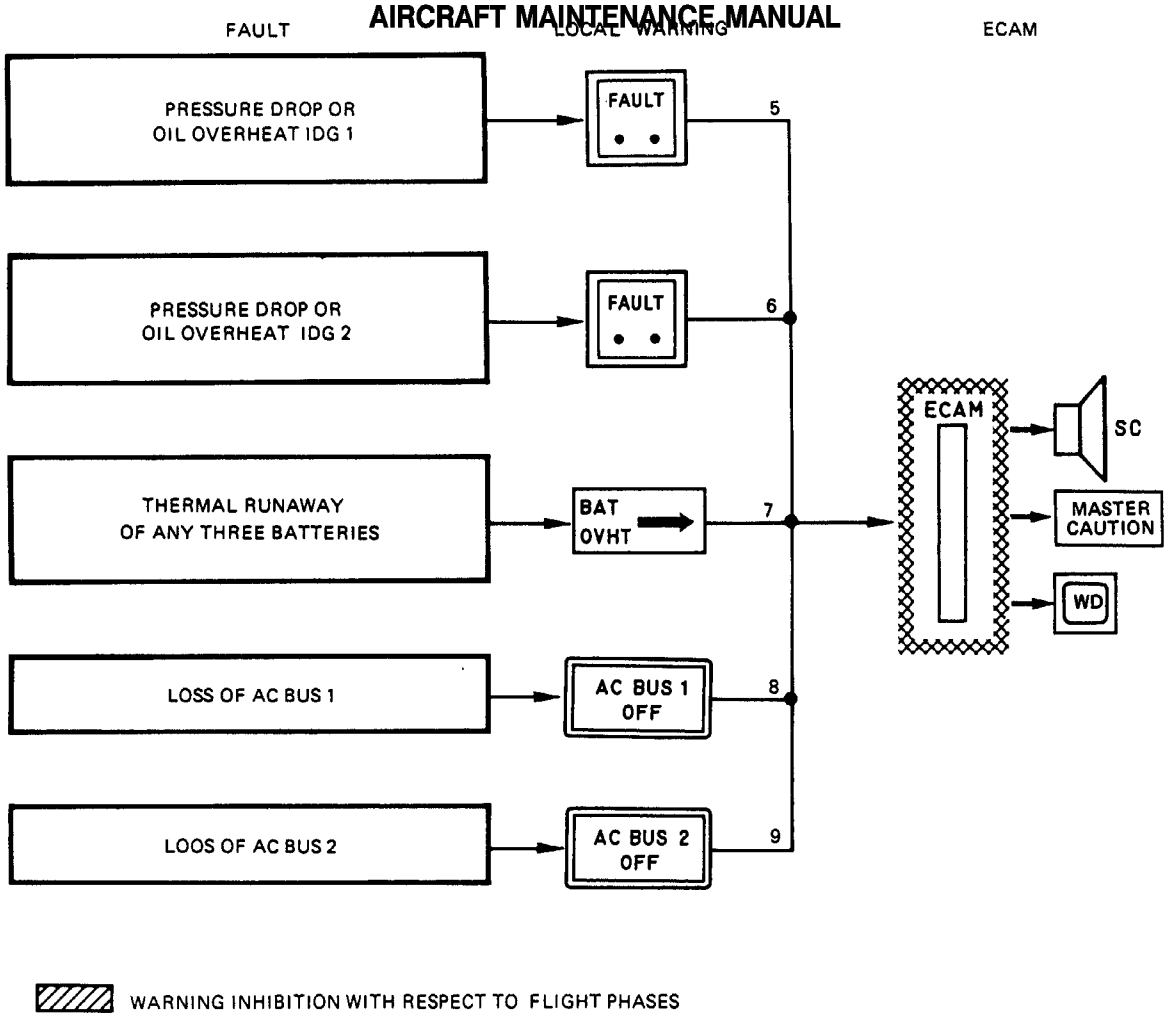
WARNING INHIBITION WITH RESPECT TO FLIGHT PHASES

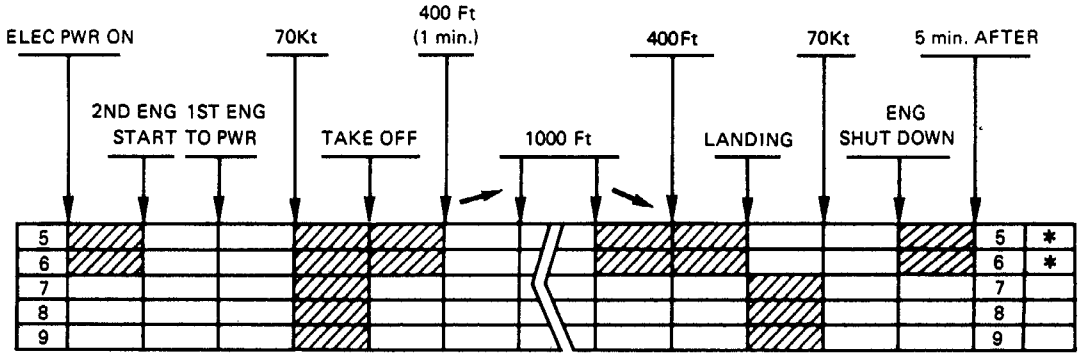


* ECAM WARNING INHIBITION ENGINE SHUT DOWN

BM5 24 00 00 0 TPM0 00

Electrical Generation Warnings
Figure 010

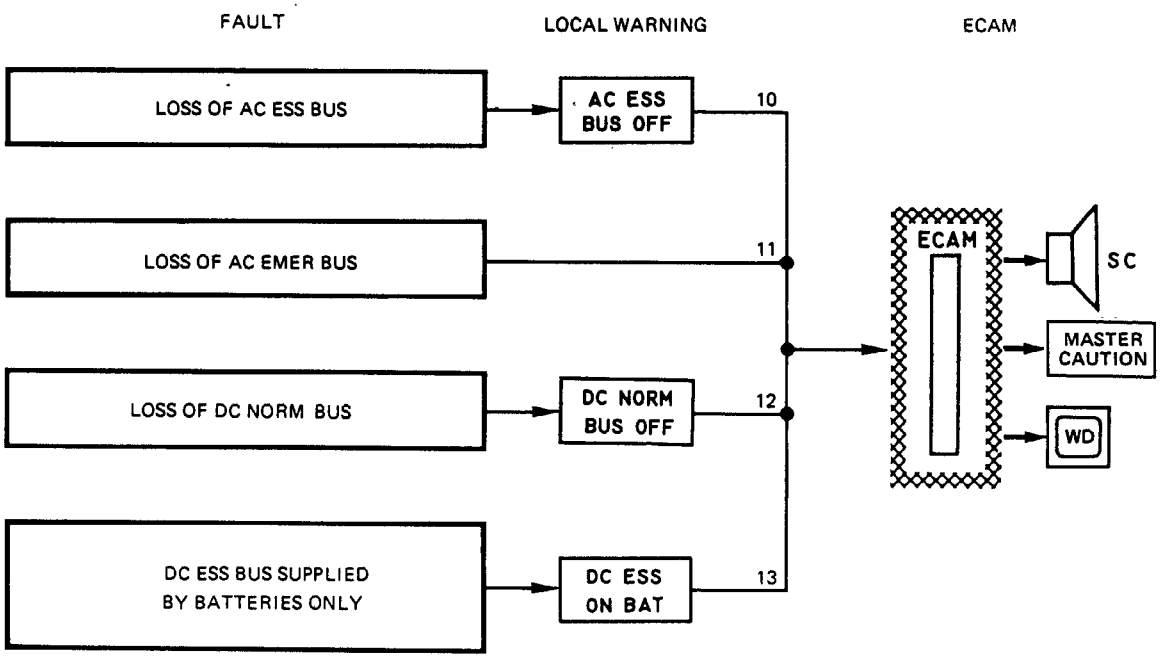


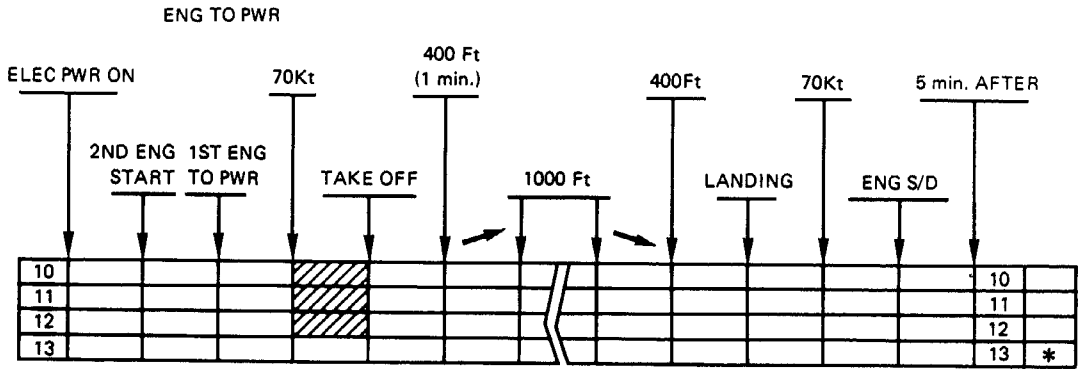


FAULT WARNING INHIBITION IN THE EVENT OF OIL PRESSURE DROP WITH ENGINE SHUT DOWN

BM5 24 00 00 0 TMMO - 14 - 08
DM5

Electrical Generation Warnings
Figure 011

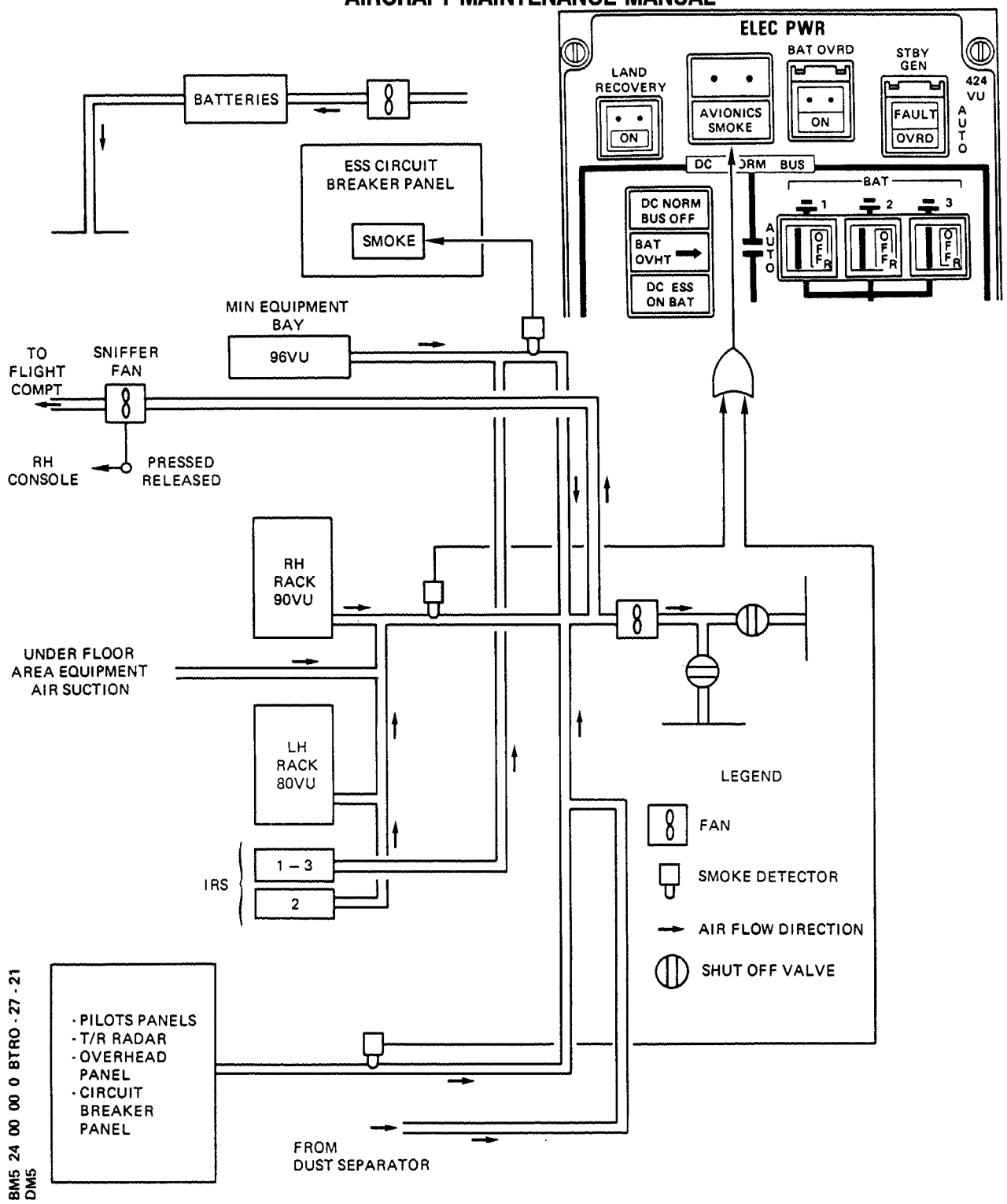




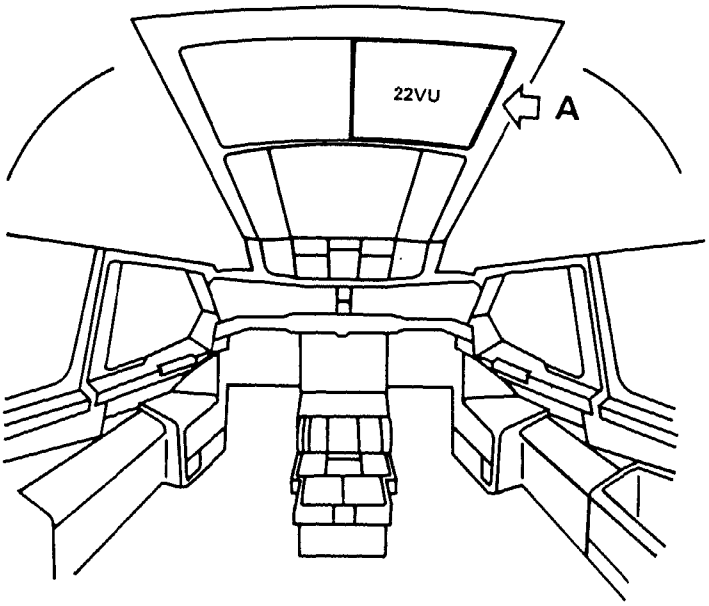
* WARNING DISPLAY UNIT IS NOT AVAILABLE IN ULTIMATE EMERGENCY CONFIGURATION

BM5 24 00 00 0 TNMO - 14 - 08
DM6

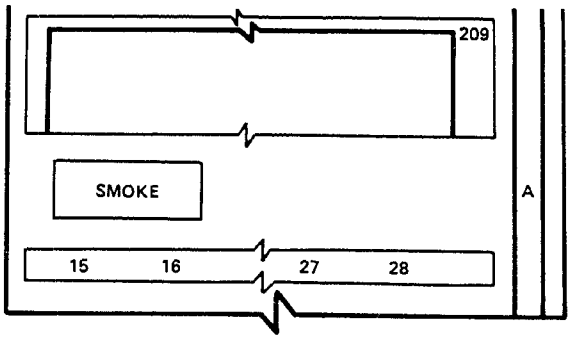
Electrical Generation Warnings
Figure 012



Smoke Detection - Schematic
Figure 013



A



BM5 24 00 00 0 TSMO - 13 - 07
DM5

Panel 22VU - Location
Figure 014

1. Circuit Breaker Reset Procedure

A. General Procedure

R (1) In flight or on ground, when a circuit breaker opens, do not attempt to reset until discrepancy that caused opening has been corrected (see applicable TSM procedure for affected equipment).

(2) Close circuit breaker after trouble has been determined and corrected.

1. General
When servicing or testing electrical circuits, implement the following electrical safety precautions in addition to observing the **WARNINGS** and **CAUTIONS** given for specific procedures.

2. Electrical Safety Precautions
WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

A. Before Starting the Job
Before work is started on any electrical circuit or equipment, or in proximity to unshielded equipment or terminals, the associated circuits must be isolated unless they are absolutely necessary for adjustments or functional tests.

B. During Adjustments and Tests
When adjustments or functional tests necessitate work on a live circuit, all precautions must be taken to prevent the risk of fire, explosion, or danger to personnel.

C. Warning of Danger
Indicate the danger to which the personnel is exposed by means of the above-mentioned **WARNING.**

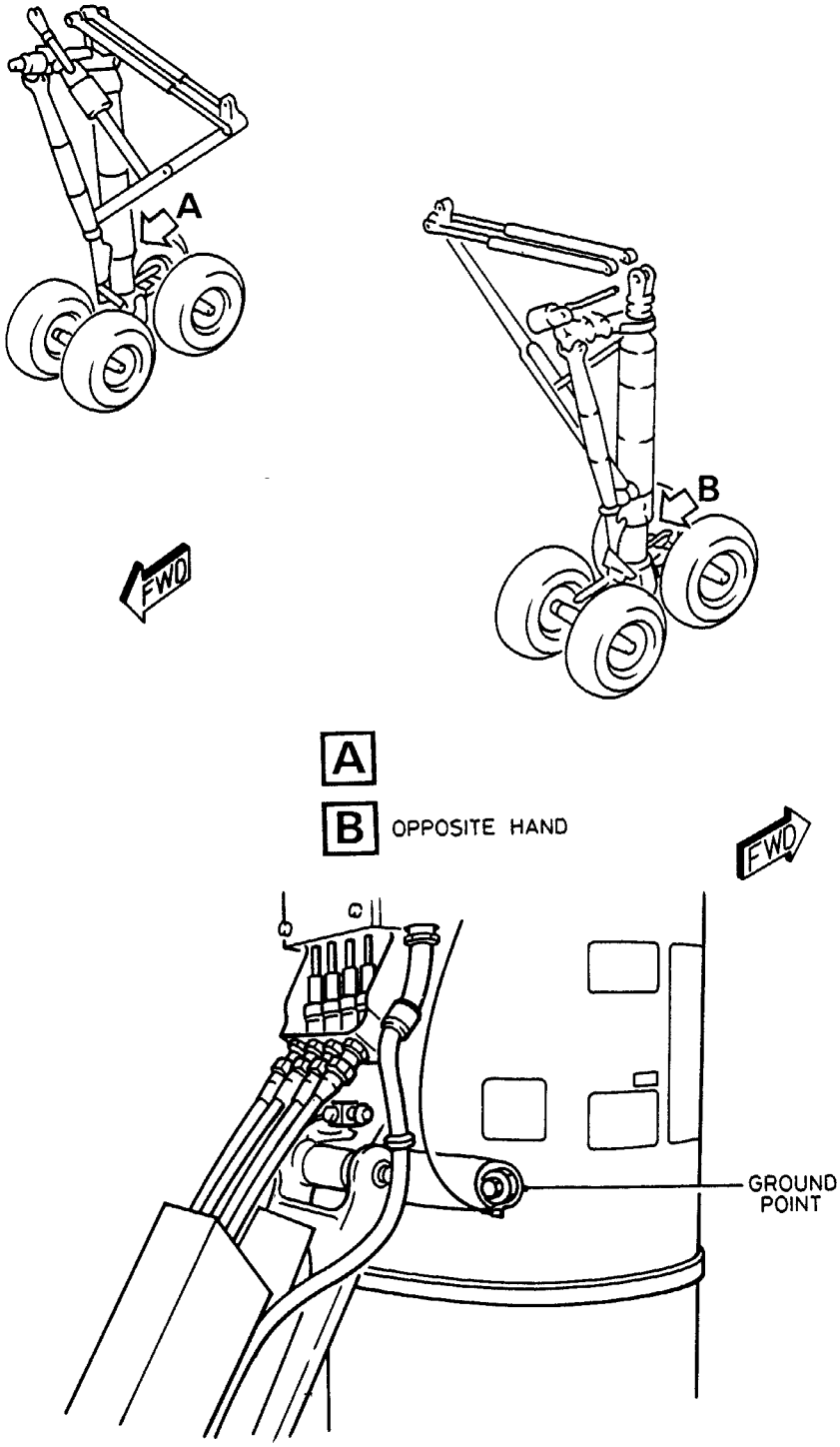
D. Grounding (Ref. Fig. 301)
The aircraft must be grounded in the following conditions :
- refueling (Ref. 12-11-28)
- maintenance
- adverse weather conditions.

R **WARNING : ALWAYS CONNECT THE GROUND CABLE TO THE PARKING GROUND POINT**
R **BEFORE YOU CONNECT IT TO THE AIRCRAFT. DO NOT ATTACH THE CABLE**
R **TO THE AIRCRAFT FIRST (THERE IS A RISK OF ELECTRIC SHOCK).**

WARNING : DO NOT WEAR A HEADSET CONNECTED TO THE AIRCRAFT, OR HANDLE ANY UMBILICAL CONNECTIONS TO THE AIRCRAFT, DURING ADVERSE ELECTRICAL WEATHER DISTURBANCES. A LIGHTNING STRIKE IS HAZARDOUS TO PERSONNEL.

R NOTE : For satisfactory removal of an electrical charge from the aircraft:
R - the aircraft ground cable must have a section of 22 mm2 (0.0033 in2) or more.
R - the total electrical resistance of the cable between the parking ground point and the grounding point of the landing gear must not be more than 500 milliohms.
R - the resistance between the end connector on the ground cable and the nearest adjacent metal part of the landing gear must not be more than 10 milliohms.

NOTE : If the aircraft is on jacks for retraction and extension checks of the landing gear, connect the parking or the hangar ground cable :
- to the aircraft grounding point on the wings,
- or on the engines.



BM5 24 00 00 3 AAMO - 00/29

Location of Grounding Point on Main Landing Gear
Figure 301

R

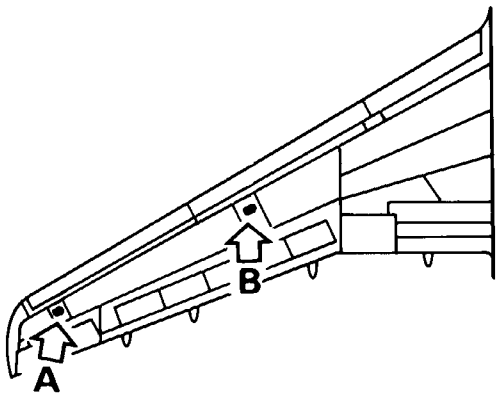
(Ref. Fig. 302, 303)

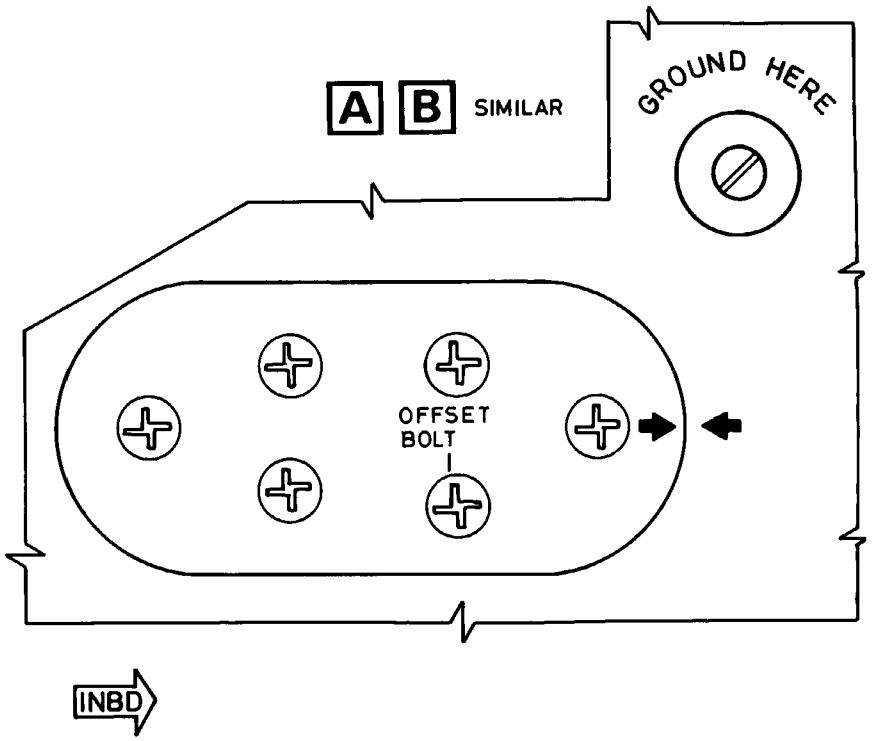
NOTE : In all other conditions the electrostatic discharge through the tire is considered as sufficient.

The aircraft must be grounded electrically in the following manner :

R - connect the ground end of the static electric ground connection to an
R approved connection on the ramp or in the hangar.
R - connect the aircraft end of the static electric ground connection to
R the connector located on the aircraft shock strut at the upper
R torque link.

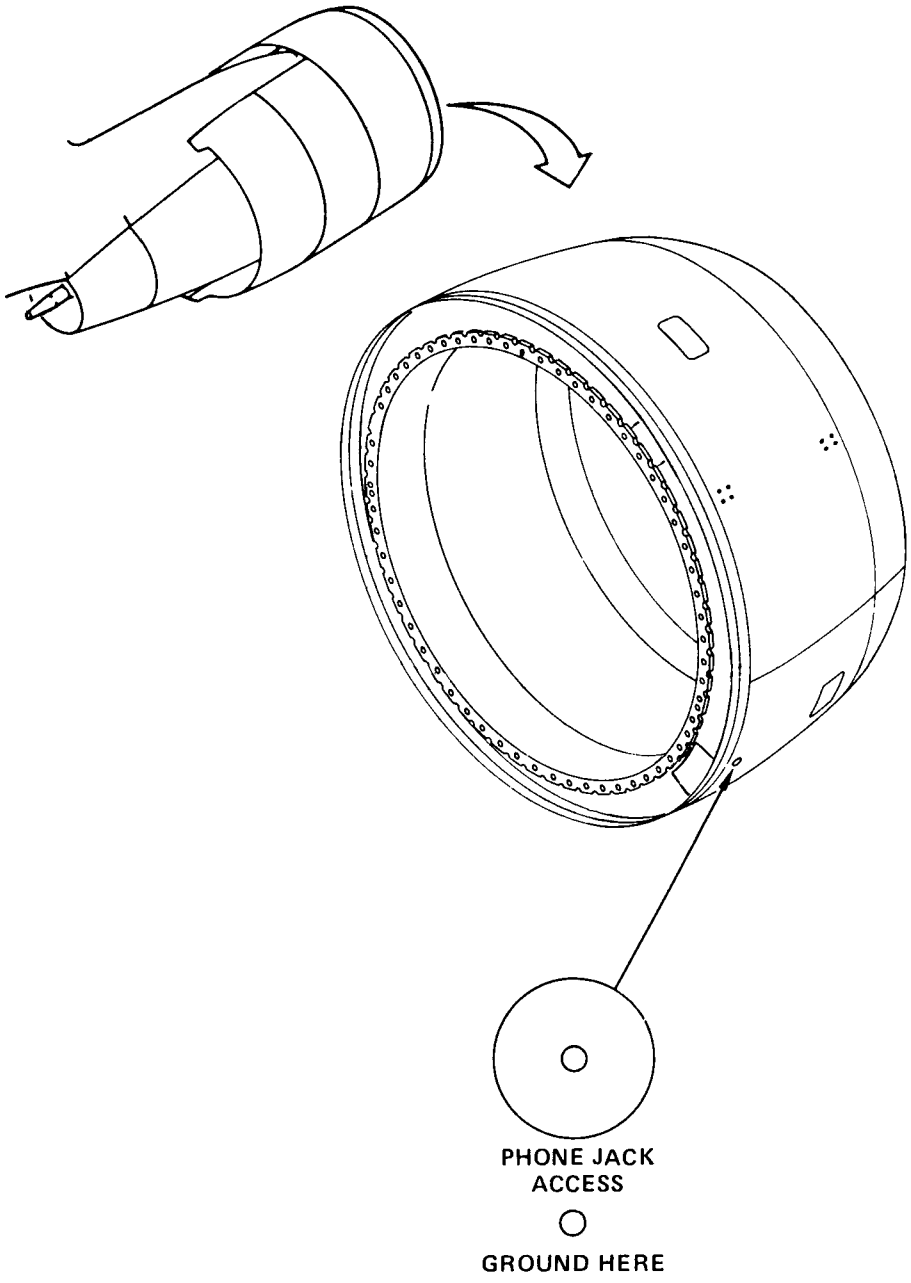
E. Feeder Connectors Connection on Engines
(Ref. Fig. 304)
These connectors must be correctly connected in order to ensure proper electrical contact.
During connection make certain that the orange serrated indicator is visible through the window located between the two serrated grips.





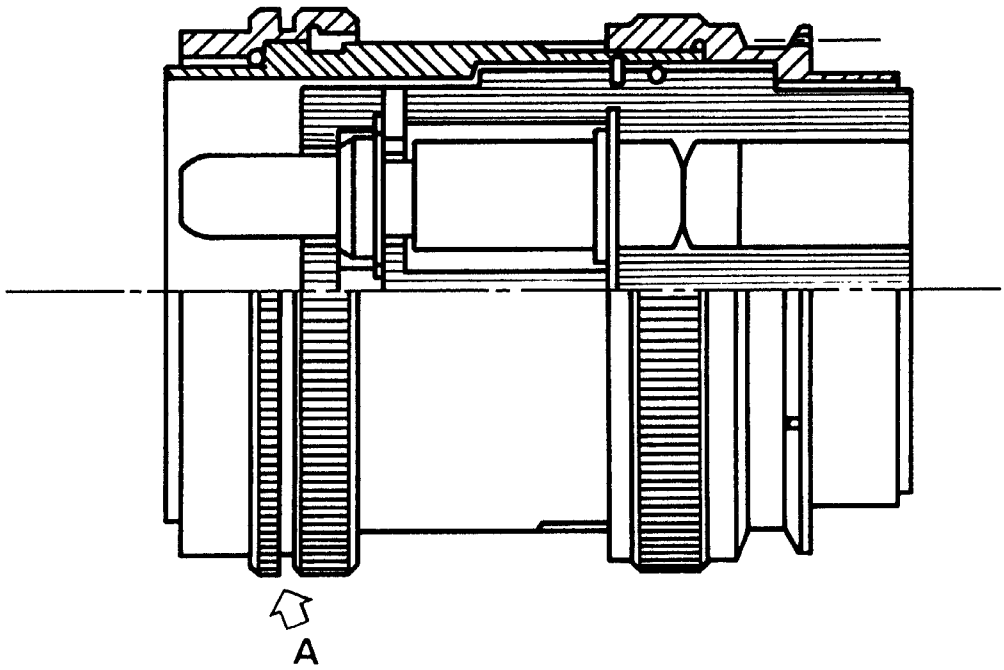
BM5 24 00 00 3 CAM0 00

Location of Grounding Point on the Wings
Figure 302



BM5 24 00 00 3 DAM0 00

Location of Grounding Point on the Engines
Figure 303



NOTE : FOR APPLICATIONS WHERE VISIBILITY IS RESTRICTED, THE FULLY MATED CONDITION CAN BE CHECKED BY FEELING THE SERRATED EDGE OF THE INDICATOR USING A POINTED INSTRUMENT OR OTHER SUITABLE DEVICE.

BM5 24 00 00 3 BAMO - 00

Feeder Connectors
Figure 304

1. Inspection/Check of Electrical Circuit

The inspection/check procedure consists of two distinct operations :

- A cursory inspection, which consists of a visual examination of all components readily visible and which does not necessitate component removal.
- A detailed inspection, which consists of removing any components which obscure the view of other components, thus permitting a detailed visual examination of all system components.

A. Cursory Inspection

(1)Check the general outer condition, the attachment and appearance of the following components :
- Panels and their equipment
- Electrical connectors
- Rack-mounted system components
- Indicators
- Electrical bonding leads

(2)Check the condition of all wiring (for signs of ageing, alteration, overheating, scaling and deformation which might detrimentally affect wiring performance).

(3)Replace defective components

B. Detailed Inspection

(1)Open access doors and casings, remove or open the panels, shields and components obscuring other components (if necessary), in order to gain access to wiring, plugs, electrical connections and various system components.

(a)Concerning the various components :
- Remove dust using a vacuum cleaner and clean further if necessary.
- Check labels and their identification.
- Check attachment and general appearance of components.

(b)Concerning wiring :
- Check identification sleeves or labels for correct condition as well as protective coatings, insulation and protective fittings.
- Check condition of wiring (for signs of ageing, alteration, overheating, scaling and deformation which might detrimentally affect wiring performance).

(c)Concerning electrical connectors :
- Disconnect plugs, check their physical and electrical conditions. Make certain that there are no traces of oxydation or corrosion, replace defective components (seals, gaskets, grommets, ferrules etc...)
- Check the tightness of connections to all electrical accessories, ground bonding leads, ground leads, busbars and terminal bars.
- Check tightness of non-safetied connectors.
- Check condition of electrical connector protections in hydraulics compartment.

(2)Replace defective components.

(3)Install removed components and restore all equipment to operating

condition.

2. Opening and Closing of all Circuit Breakers

A. Reason for the JOB
The inspection/check procedure is a mechanical check for correct operation of the circuit breakers.

R B. Equipment and Materials

ITEM	DESIGNATION
(1)Warning Notice	
(2)Access Platform	
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-50-10, P. Block 1	Circuit Breaker Panel 20VU
- 24-50-20, P. Block 1	Circuit Breaker Panel 120VU
- 24-50-30, P. Block 1	Circuit Breaker Panels 800VU and 811VU
- 24-50-40, P. Block 1	Circuit Breaker Panel 100VU

R C. Job Set-Up
R (1)In the cockpit, put a warning notice in position to tell persons not to operate the pushbutton switches on the panels 424VU, 429VU and on the throttle control levers.
R (2)Put a warning notice in position on the door 121EL to tell persons not to connect the external power connector to the aircraft EXT PWR receptacle.
R (3)Make sure that the aircraft electrical circuits are de-energized (Ref. TASK 24-41-00, P. Block 301).
R (4)Install the access platform at the access door 121BL.
R (5)Open the access door 121BL.
R (6)Remove or open the panels to get access to the circuit breakers.

R D. Opening and Closing of Circuit Breakers
R (1)Open and close each circuit breaker on these panels :
R NOTE : Open and close the circuit breakers with the aircraft electrical circuit de-energized.
R (a)In the flight compartment :
R - Overhead panels 21VU and 22VU (Ref. 24-50-10, P. Block 1)
R - Circuit breaker panels 131VU, 132VU, 133VU (Ref. 24-50-20, P. Block 1).
R (b)In the passenger compartment :
R - Panels 800VU and 811VU (Ref. 24-50-30, P. Block 1).
R (c)In the avionics compartment :
R - AC generation rack 101VU
R - DC generation rack 106VU
R - Battery contactor box 281VU (Ref. 24-50-40, P. Block 1).

R E. Close-Up
R (1)Close the access door 121BL.
R (2)Remove the access platform from the access door 121BL.

R (3)Remove the warning notice from the door 121EL.

GENERATOR DRIVE

The three aircraft generators are driven at constant speed, so that the distribution network can be supplied with a fixed frequency (Ref. Fig. 001).
Each engine generator is driven by means of an integrated hydromechanical speed regulator (IDG : Integrated Drive Generator). The assembly is lubricated and cooled by its own oil system (Ref. 24-11-00, P. Block 1). The auxiliary generator is directly driven by the APU which rotates at constant speed. The cooling and lubrication are provided by the APU oil system (Ref. 49-00-00, P. Block 1).
For IDG location on the engine :

R **ON A/C 001-100,

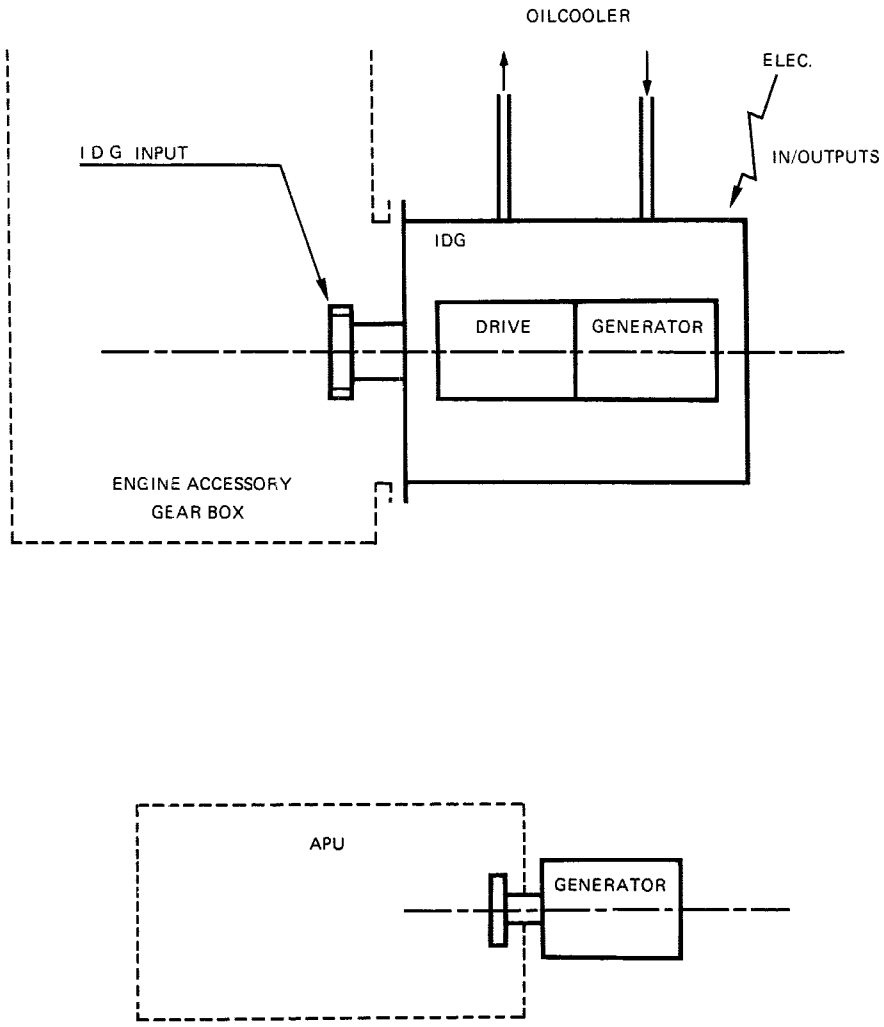
(Ref. Fig. 002)

R **ON A/C 101-200,

(Ref. Fig. 003)

R **ON A/C ALL

For auxiliary generator location on the APU : (Ref. Fig. 004)



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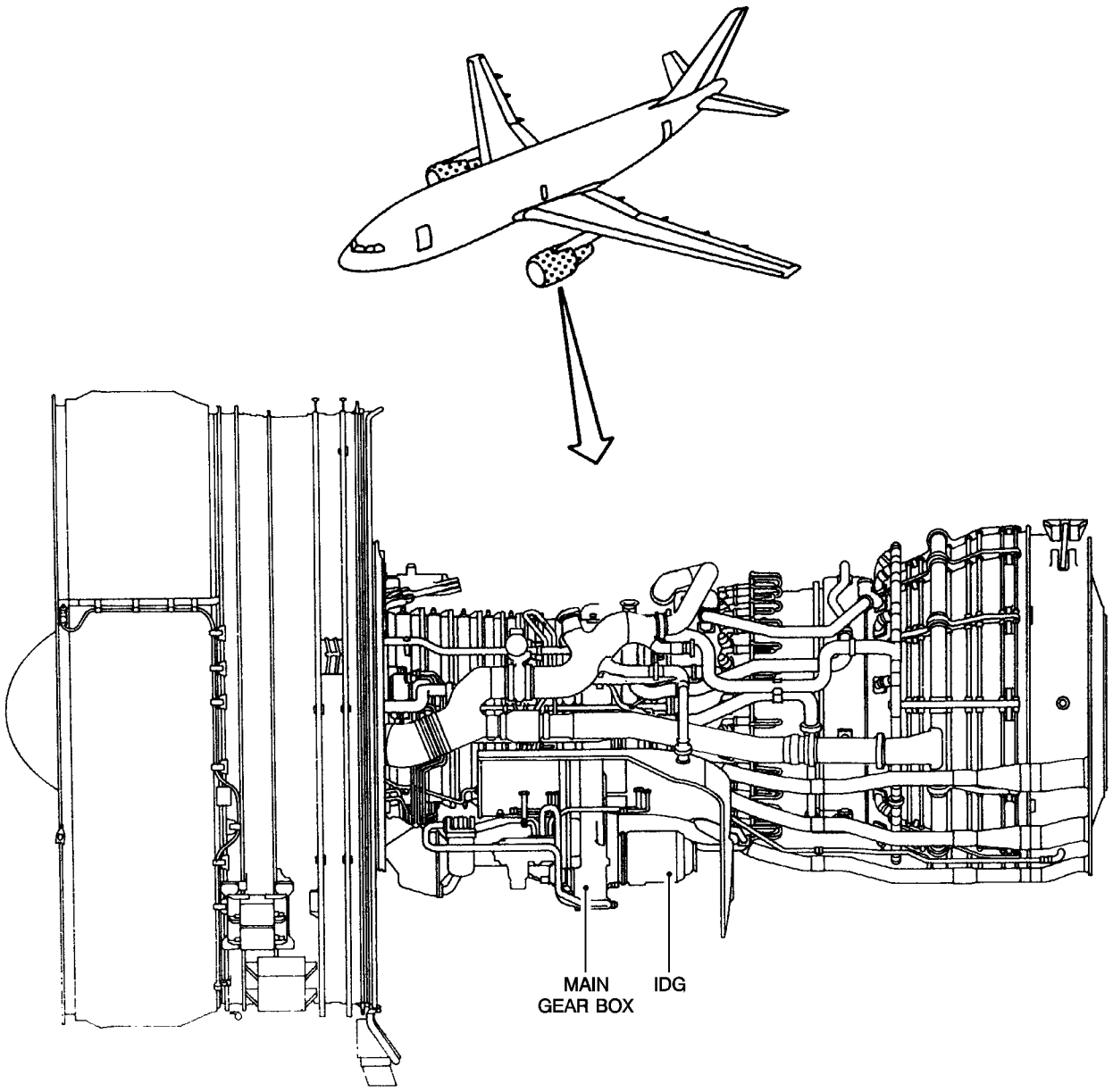
Generator Drive
Figure 001



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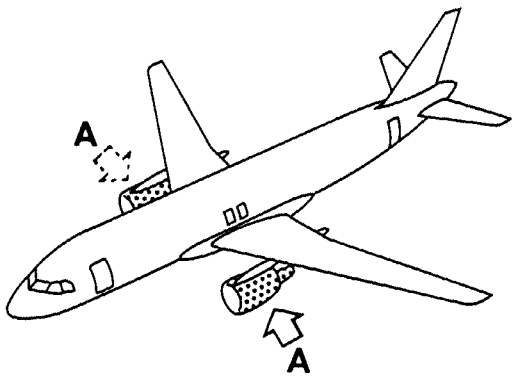
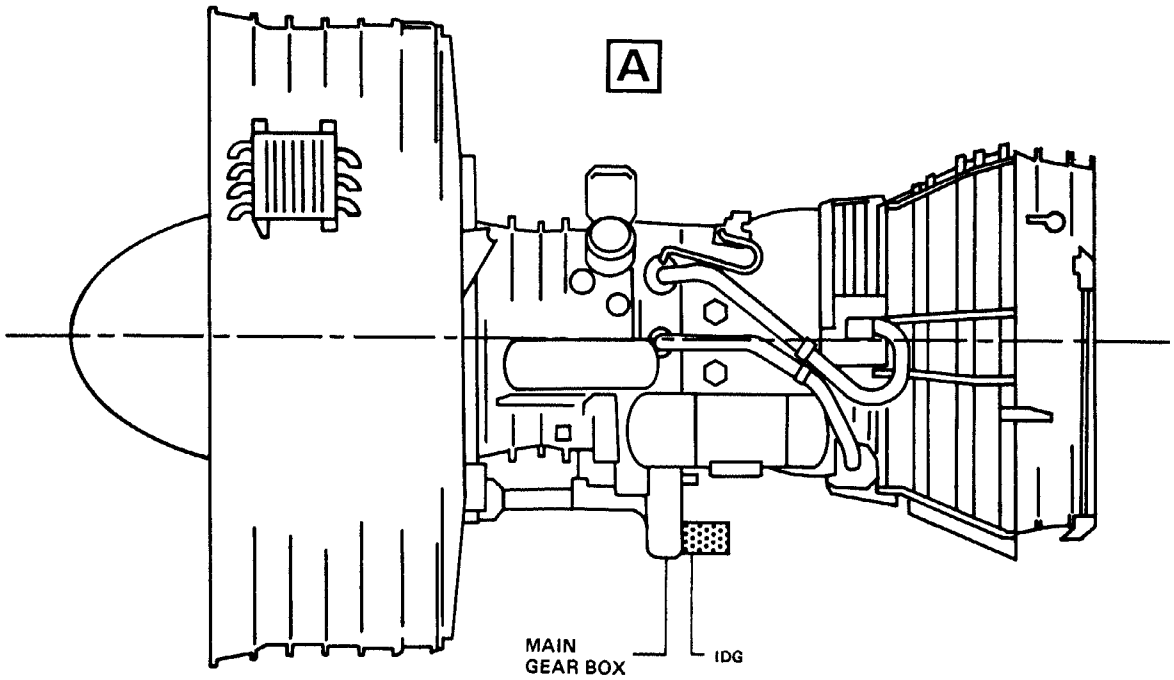
Generator Drive - IDG Location
Figure 002





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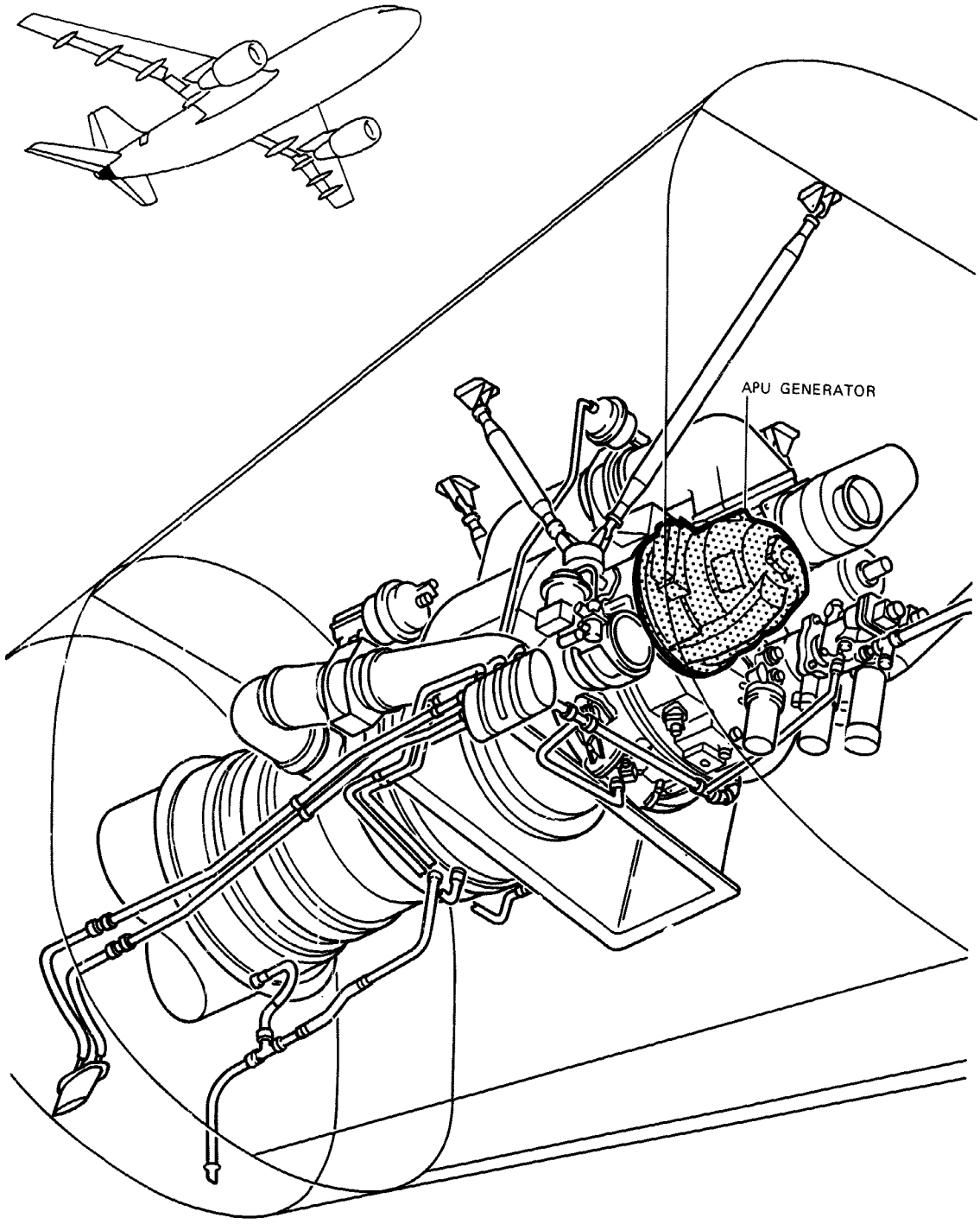
Generator Drive - IDG Location
Figure 003



Generator Drive - APU Generator Location
Figure 004

IDG SYSTEM

1. General

Each IDG is mounted on the gearbox of each of the aircraft engines. The IDG is made up of a constant speed drive (CSD) and a generator, mounted side by side in a common housing. Variable input speeds from the aircraft engine are converted to a constant output speed of 12,000 revolutions per minute to drive the synchronous, 400 hertz generator.

The assembly is cooled and lubricated by a separate oil system, except for the IDG input spline, which is lubricated by gearbox oil.

2. Component Location (Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
IDG1	DRIVE PORT		451	451BL	24-11-00
IDG2	DRIVE PORT		461	461BL	24-11-00
5XT	ANNUNCIATOR - ELEC PWR/ IDG1	424VU	211		24-11-00
6XT	ANNUNCIATOR - ELEC PWR/ IDG2	424VU	211		24-11-00
7XT	P/BSW - ELEC PWR/PUSH TO DISC IDG1	424VU	211		24-11-00
8XT	P/BSW - ELEC PWR/PUSH TO DISC IDG2	424VU	211		24-11-00
1XU	GCU - 1	107VU	121	121BL	24-11-00
2XU	GCU - 2	107VU	121	121BL	24-11-00

3. Operation of the Generator Drive Section (Ref. Fig. 002, 003)

It is mainly composed of :

- a differential gear train
- governor and control cylinder assemblies.

The mechanical power from the accessory gearbox is transmitted to the differential gears by means of :

- a shaft with a shear section, which limits the torque in case of internal mechanical failure.
- a disconnect mechanism, which enables considerable internal mechanical damage to be avoided in case of failure of the lubrication and cooling oil system.

This mechanism comprises :

- a dog tooth clutch mechanism
- a solenoid pin the disengagement of which is controlled electrically from the flight compartment (Ref. para. 4.A.)

When the pin is retracted, the worm mechanism is engaged and the rotation of the drive shaft disconnects the IDG input shaft from the differential gear shaft.

NOTE : - the IDG cannot be reconnected in flight
The system can only be reset on the ground, with engines shut down and by manual operation of a reset handle located on the IDG.
- the IDG disconnection must not be performed with engines shut

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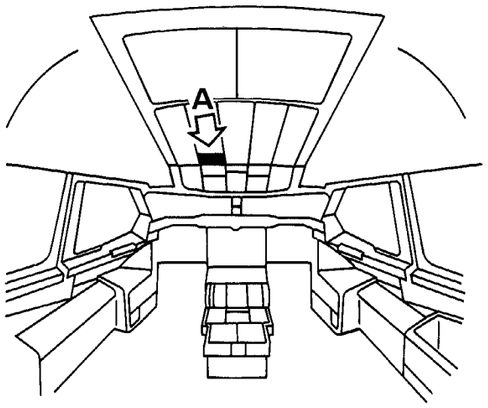

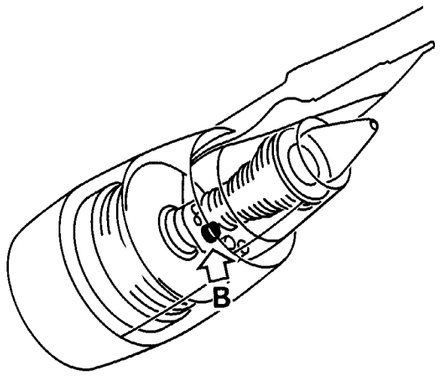

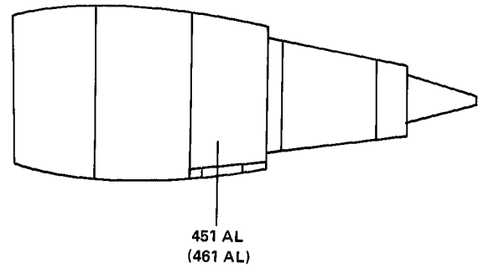

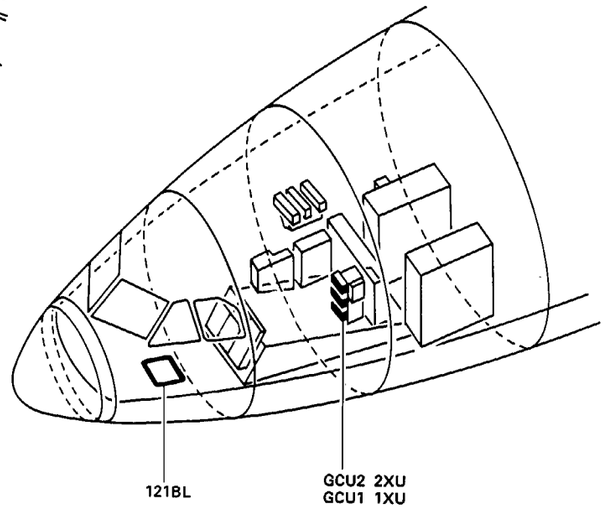

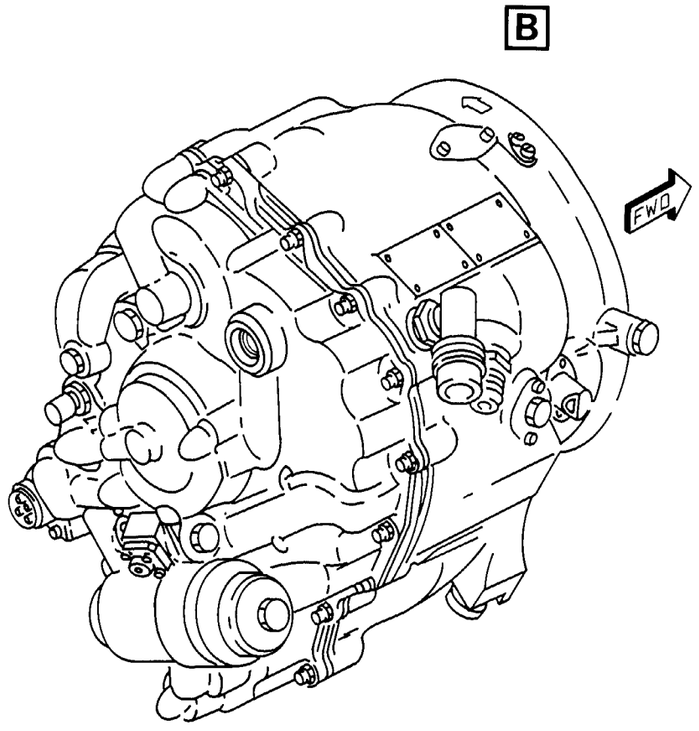

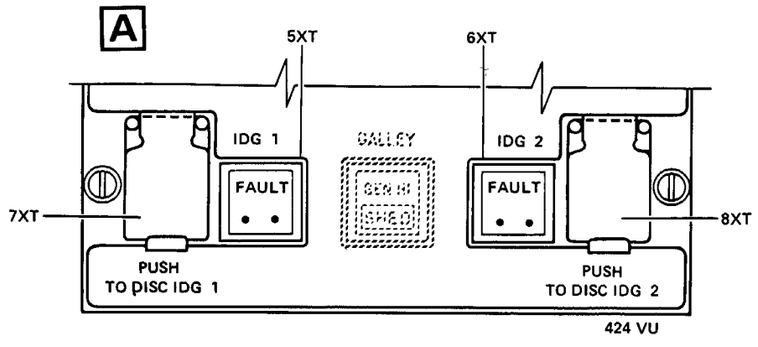

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IDG System - Component Location
Figure 001

EFFECTIVITY: 001-100,

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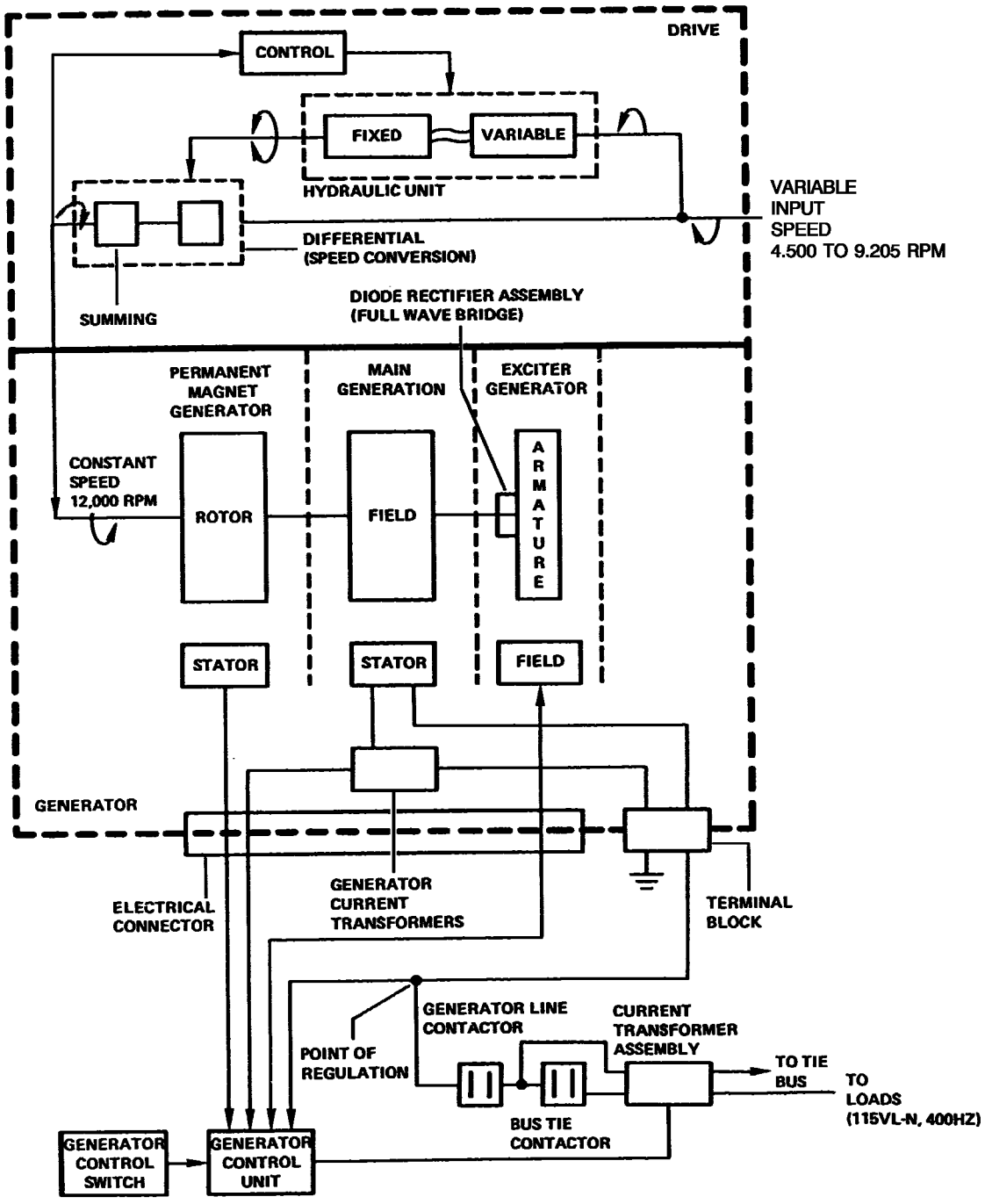
down.

NOTE : Make sure that the IDG does not operate for more than 50 hours in the disconnected mode.
If the IDG operates for 50 hours in the disconnected mode, it will be necessary to :
- replace the IDG
- send the removed IDG for a shop inspection. There is a risk of damage to the ball bearing assembly on the input shaft.

The differential gear train :
- doubles the IDG input speed which is comprised between 4500 and 9075 rpm,
- and adds or subtracts rpm to the doubled input speed to obtain a constant output speed of 12,000 rpm corresponding to the generator drive speed. This is accomplished by the two hydromechanical units through the input ring gear.

The hydraulic trim is composed of two hydromechanical units, so-called fixed and variable, and hydraulically coupled. They operate either as a motor or as a pump.
The so-called fixed unit transmits the compensation to the differential, either plus or minus rotations, as necessary. Finally, the governor detects the differential output speed and controls, the so-called variable unit by means of a control cylinder so that the speed remains constant.
It should be noted that the accessories necessary to the system operation (pressurizing pumps, drainage pump and deaerator) are driven from the differential output, and thus at constant speed.
A speed sensor, located upstream of the disconnect mechanism, transmits IDG input speed information to the generator control unit (GCU) for control purposes (Ref. para.4) and (Ref. 24-22-00, P. Block 1).



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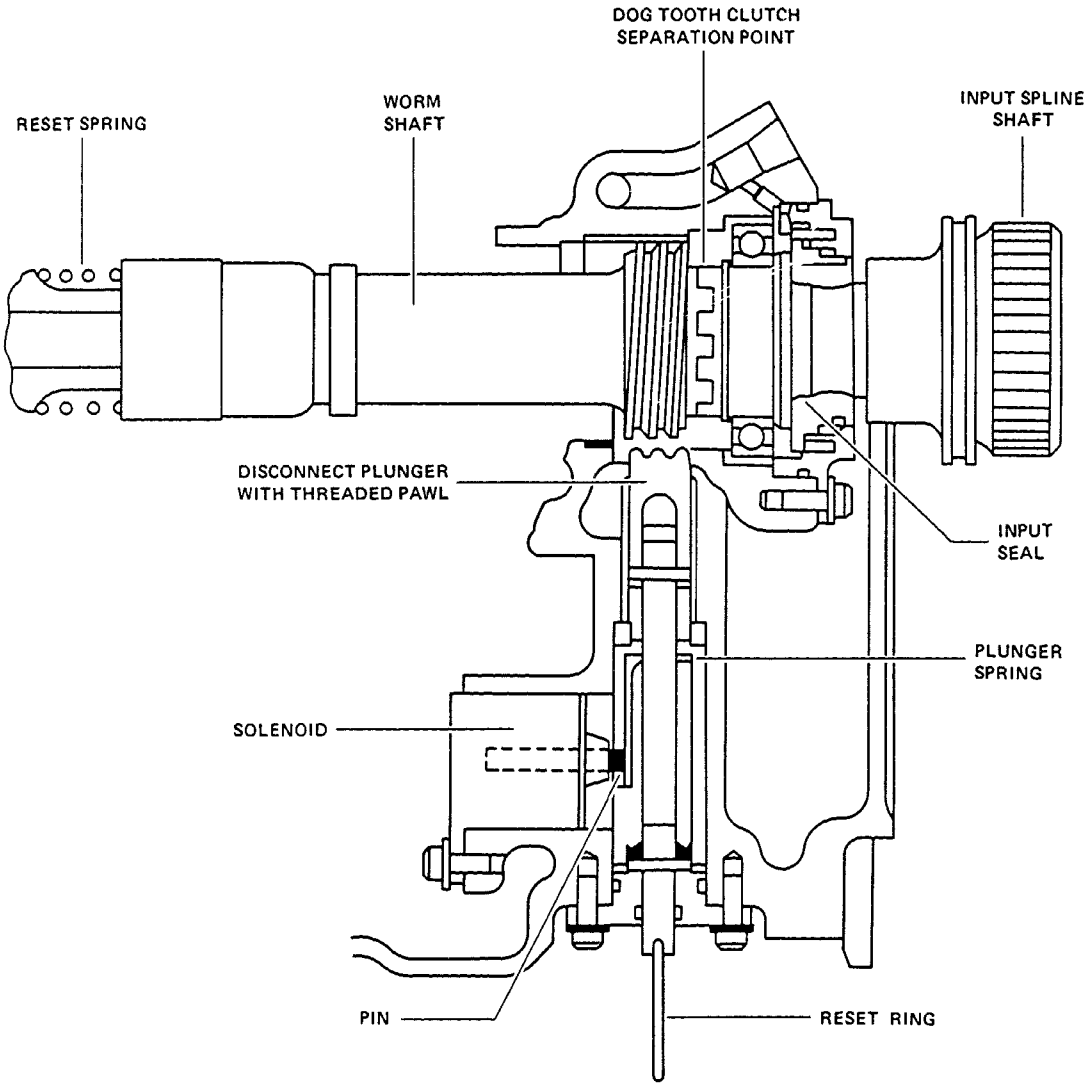
IDG System - IDG Drive and Speed Conversion - Schematic
Figure 002



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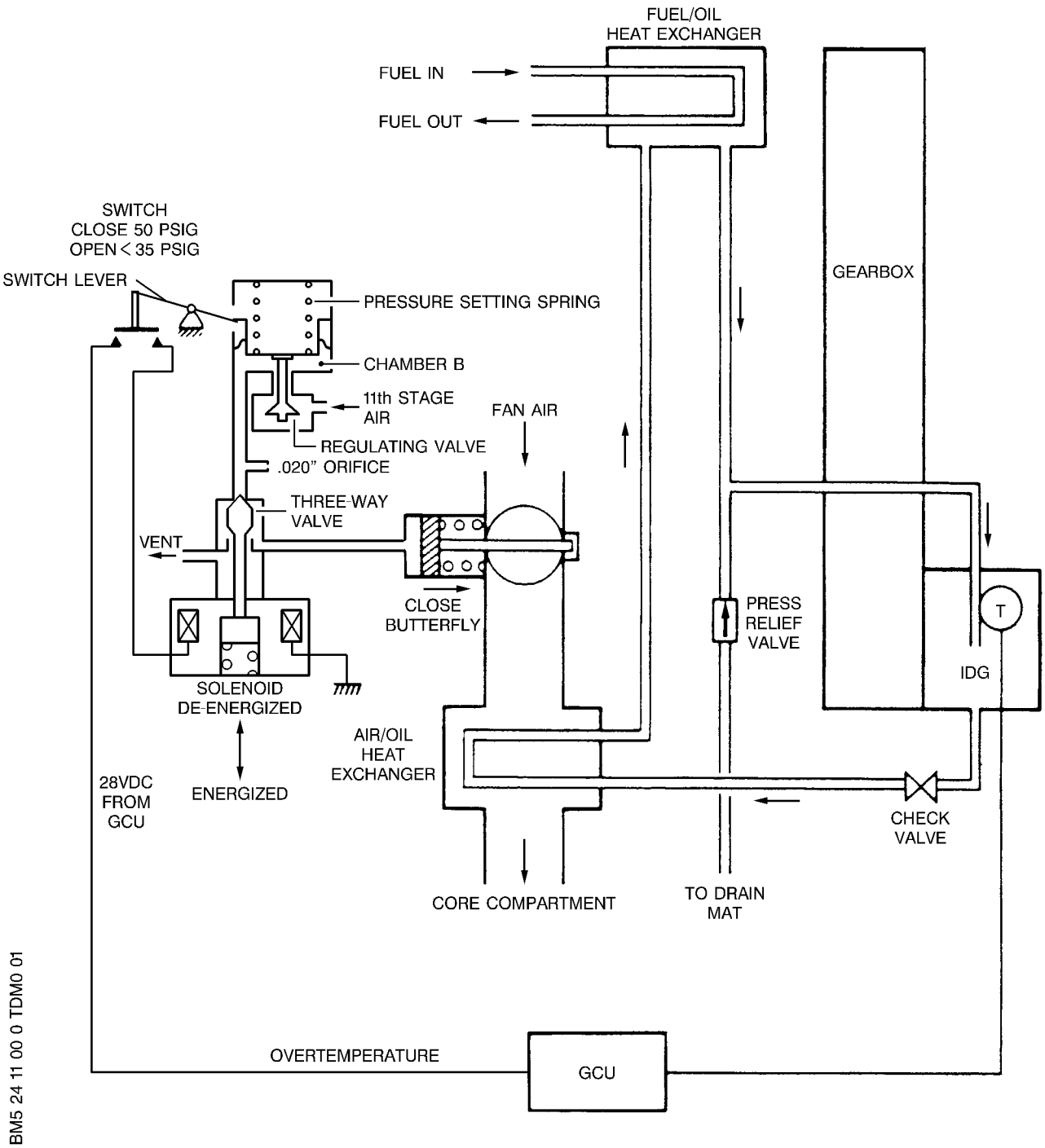
IDG System - Generator Drive Disconnect Mechanism
Figure 003

4. Tube and Cooling Oil System (Ref. Fig. 004, 005)
The oil drained in the bottom of the IDG casing, is delivered by a vane type pump and through a filter to the external cooling system before returning to the IDG.

A. Cooling
The cooling system comprises two series-mounted heat exchangers :
(1) Air/oil heat exchanger (Ref. Fig. 004)
An air supply duct is attached to the booster bypass chamber and provides bleed air to the air/oil cooler through an on-off airflow control valve. Flow is scheduled only during low engine power operation when the fuel flow available for cooling is small and when air bleed is not detrimental to engine performance.
The need for IDG cooling air is sensed by routing an 11th stage air line from the compressor.
The valve actuator is spring loaded to the open position when the engine is stopped, at start-up and at low power. As the engine speed is increased, the Stage 11 pressure rises causing "chamber B" pressure to rise and the "regulating valve" to move against the "pressure-setting spring". As this movement progresses, a condition is reached which allows the "switch lever" to close the 28 volt circuit and to energize the solenoid that moves the "three-way valve" against its spring. At this time, the Stage 11 air pressure is admitted into the actuator to close the valve. A flow limiting orifice in the passage from the three-way valve to the actuator chamber slows the valve closing action to reduce the effect of impact loads.
If temperature of IDG inlet oil reaches 126.5°C (260°F) an electrical signal from the aircraft causes the control valve to open, thus permitting the air flow path.
If IDG temperature reaches 142°C (288°F) increasing, AC ELEC page is displayed on the R ECAM display unit. If IDG temperature reaches 185°C (364°F), associated warnings appear :
- IDG FAULT, MASTER CAUTION light and warnings on ECAM display units.
In normal operation, if IDG oil pressure reaches 140 ± 25 PSI (9.8 ± 1.75 bar) (oil Low Pressure), associated warnings appear.
- IDG FAULT, MASTER CAUTION light and warnings on ECAM display units.
(2) Fuel/oil heat exchanger (Ref. Fig. 005)
The IDG fuel/oil heat exchanger is located on the right side of the accessory gearbox in the core compartment below the heat shield.
The fuel flowing out of the MEC (Ref. 73-20-00) is used as a cooling agent for the IDG oil system. The oil flowing out of the IDG goes through an air/oil heat exchanger and then through the fuel/oil heat exchanger.
This heat exchanger is made of tubes which carry the fuel while the IDG oil passes around the tubes.
It enables the IDG oil to be cooled to acceptable limits during normal engine operation, and recovers the transferred heat by increasing the fuel temperature before it enters the fuel manifold. To protect the IDG from overpressure due to an internal leak in the fuel-oil cooler, an overpressure valve is provided in the oil return line with a drain line leading to the drain mast. At low engine power, when the fuel flow is too



IDG System-Oil Cooling System
Figure 004

small to be a complete heat sink for the IDG heat rejection, the air/oil heat exchanger is activated to provide additional cooling. The air for this air/oil heat exchanger is obtained from the engine's booster bypass passage. Airflow is controlled by the IDG air valve.

B. Pressurization

After degassing, the oil is pressurized by a vane-type charge pump, to which is associated a pressure regulating valve.

This pressurized oil is then distributed to provide

- operation of the hydraulic trim and control governor/cylinder assembly.
- the lubrication and cooling of the differential, generator and various mechanical units.

A pressure switch indicates a drop of oil pressure in the system (Ref. para.4).

A mechanical pressure differential indicator located on the IDG, indicates a filter clogging. A thermal locking device inhibits its activation during a cold start.

In case of filter clogging, a bypass valve protects the scavenge pump by reducing the pressure produced.

A second bypass valve connected between IDG oil input and output oil ports enables pressure control in the external system.

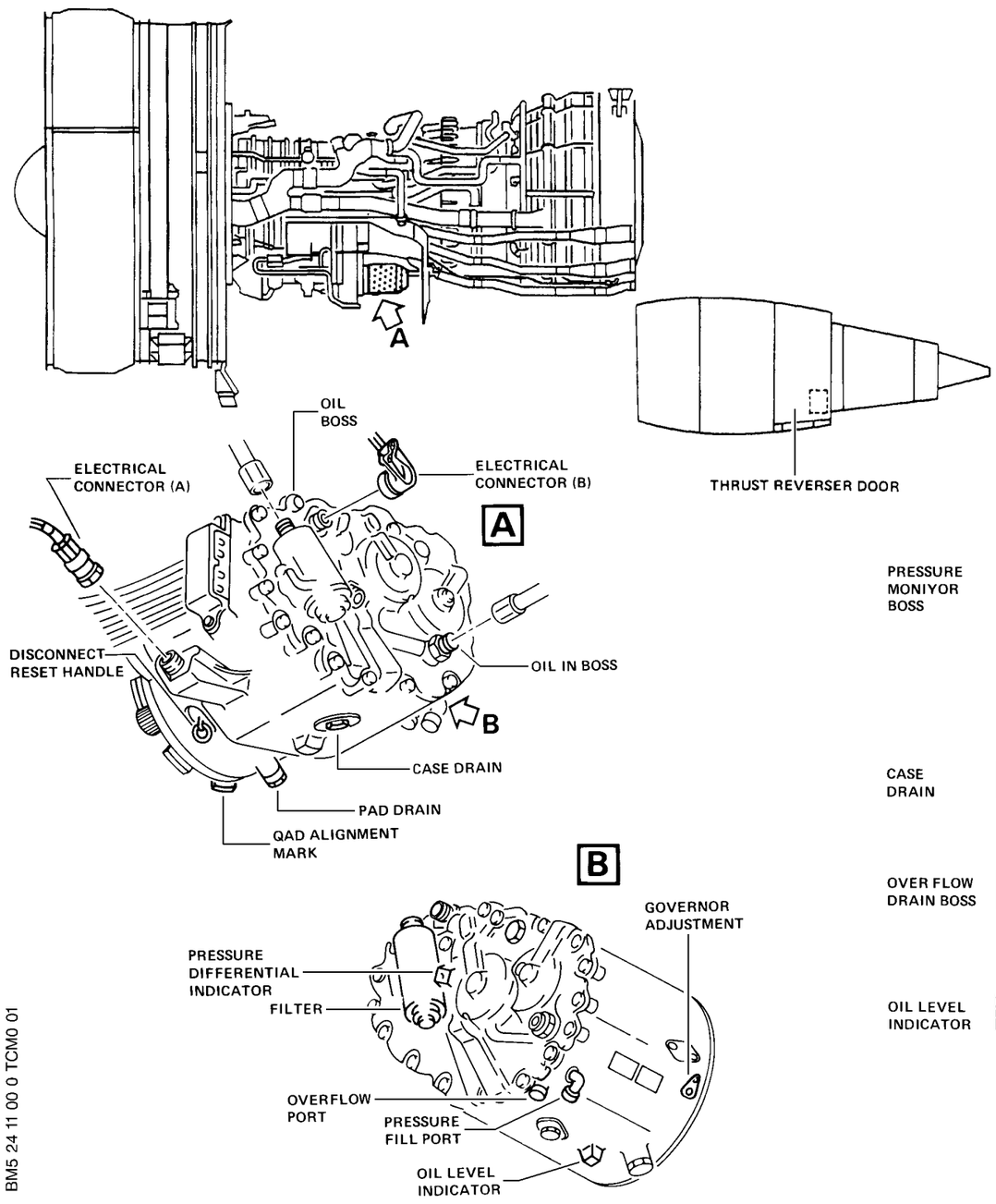
This valve is operative during cold start in particular.

An air vent valve compensates for the depressurization created by the pumps when the IDG starts running. After starting this valve closes and the IDG is self-pressurized.

A push-to-vent feature on the vent valves allow for manual depressurization of the system prior to oil servicing.

The IDG servicing and maintenance operations are performed by means of drainage, filling and overflow ports, an oil level indicator and a direct access to the filter.

Two temperature bulbs enable monitoring of the oil-in and oil-out temperatures (Ref. para.4).



IDG System - IDG Hydraulics Schematic and Component Location
Figure 005

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5. Control and Indicating Circuits
(Ref. Fig. 006)
The main parameters related to the IDG drive part operation i.e.
- oil-in and oil-out temperatures
- system low pressure
- drive speed

are permanently monitored by the GCU which controls :
- warnings and indications in the flight compartment
- the fan air supply valve of the cooling system air/oil cooler.

A. Controls and Indications in the Flight Compartment (Ref. Fig. 007)
Amber FAULT legend of ELEC PWR/IDG1 or 2 annunciator (5XT or 6XT) comes on with triggering of the master warning system in case of :
- oil overheat (high outlet temperature)
- oil drop of pressure when it is not due to drive underspeed.

PUSH-TO-DISC IDG1(2) safety guarded pushbutton switch (7XT or 8XT) enables the manual control of the IDG disconnection in case of illumination of FAULT legend.

CAUTION : - IDG DISCONNECTION IS IRREVERSIBLE IN FLIGHT. THE SYSTEM CAN ONLY BE RECONNECTED ON THE GROUND WITH ENGINES SHUT DOWN.
- THE IDG MUST NOT BE DISCONNECTED WITH ENGINES SHUT DOWN.

NOTES : - Illumination of FAULT legend is inhibited at engine shut down (under speed) in particular.
It goes off as soon as the IDG drive speed is lower then 2000 rpm.
- The GCU also provides IDG output oil temperature information to the SDAC (Ref. 31-55-00, P. Block 1 ECAM DATA BOOK)

B. Air/Oil Cooler Air Supply Valve Control (Ref. Fig. 006)
The cooler does not operate permanently it is only used as a help to the cooling system in particular operating conditions.
The air supply valve is controlled according to the IDG oil-in temperature and engine speed. It opens when the temperature reaches 127°C or when the engine is at low power settings.
The valve closes when the temperature drops below 104°C, when the engine is at high power settings.

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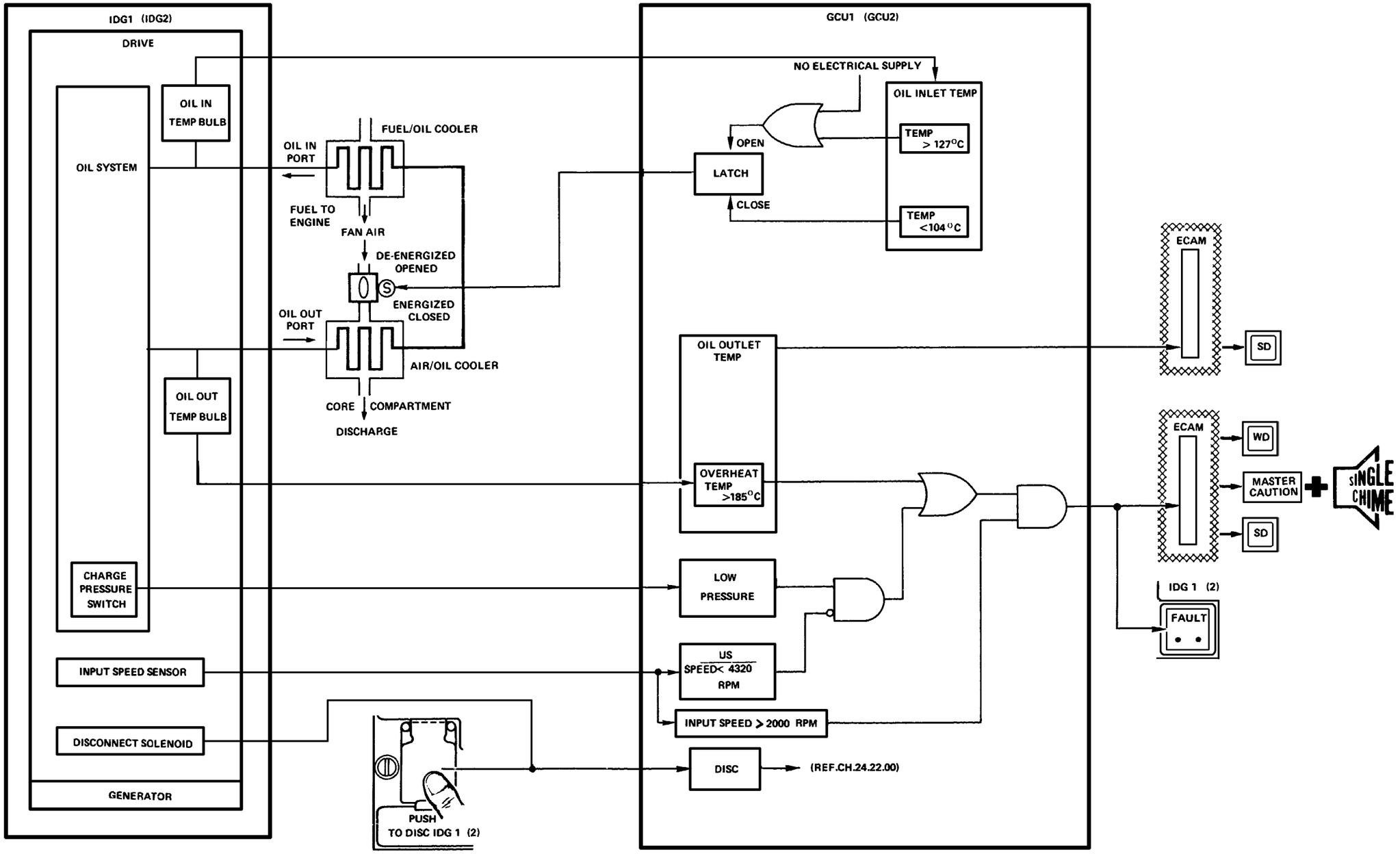

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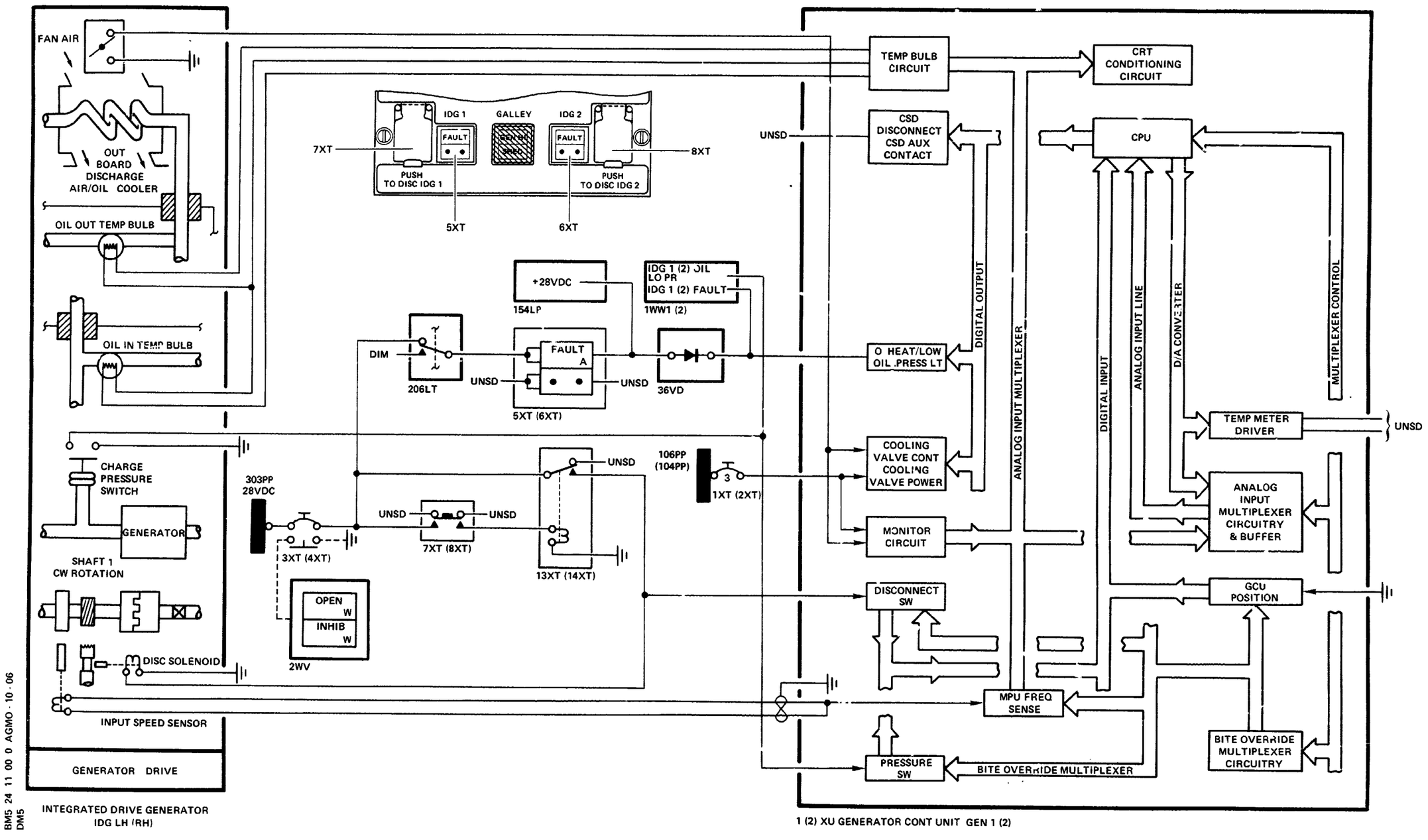
IDG System - Generator Drive Control and Indicating
Figure 006



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IDG System - Control and Indicating in Flight Compartment
Figure 007

6. General Characteristics

This table covers the main characteristics of the IDG drive section.

General	
- Input speed	4500/9075 rpm
- Output speed (Generator rotor)	12000 ± 150 rpm
- Utilization limits in altitude	-300/13,150 m
in ambient temperature	-55/177°C
- Maximum case temperature	177°C
- Shear section	9000 ± 400 in./lb
- Disconnect control solenoid :	
resistance	2.5 Ω at 24°C
control voltage	17/30VDC
Oil system	
- Oil used	Aeroshell Turbine Oil 555, Type II Aeroshell Turbine Oil 390, Type I Aeroshell Turbine Oil 500, Type II Castrol Oil 5000, Type II Exxon Turbo Oil 25, Type II Exxon Turbo Oil 85, Type II Exxon Turbo Oil 2389, Type I Exxon Turbo Oil 2380, Type II Mobil Jet Oil II, Type II Mobil Jet Oil 254, Type II Royco Turbine Oil 500, Type II Royco Turbine Oil 555, Type II
- Pump regulated pressure	220/280 psi
- Cooler system flow rate	14/17 g/mn
- Cooler bypass valves	250 ± 60 psi
- Filter bypass valve	350 psi
- Low pressure switch	140 ± 25 psi
- Oil capacity (cooler system excluded).	2.8/4.4 l
- Normal operating temperatures	
Oil-in	70/105°C
Oil-out	80/115°C
- Maximum permissible oil-in temperature (permanent)	127°C
GCU controls	
- Overheat	OOT 185 ± 5°C
- Air/oil cooler air supply valve	
Opening	OIT > 127 ± 3°C
Closure	OIT < 104 ± 3°C
- Drive under speed (low pressure inhibited)	4320 ± 30 rpm
- Low drive speed (IDG/FAULT legend goes off)	<2000 rpm

IDG SYSTEM

1. General

Each IDG is mounted on the gearbox of each of the aircraft engines. The IDG is made up of a constant speed drive (CSD) and a generator, mounted side by side in a common housing. Variable input speeds from the aircraft engine are converted to a constant output speed of 12,000 revolutions per minute to drive the synchronous, 400 hertz generator.
The assembly is cooled and lubricated by a separate oil system, except for the IDG input spline, which is lubricated by gearbox oil.

2. Component Location

(Ref. Fig. 001)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
5XT	ANNUNCIATOR - ELEC PWR/ IDG1	424VU	211		24-11-00
6XT	ANNUNCIATOR - ELEC PWR/ IDG2	424VU	211		24-11-00
7XT	P/BSW - ELEC PWR/PUSH TO DISC IDG1	424VU	211		24-11-00
8XT	P/BSW - ELEC PWR/PUSH TO DISC IDG2	424VU	211		24-11-00
1XU	GCU - 1	107VU	121	121BL	24-11-00
2XU	GCU - 2	107VU	121	121BL	24-11-00

3. Operation of the Generator Drive Section (Ref. Fig. 002, 003)

It is mainly composed of :
- a differential gear train
- governor and control cylinder assemblies.

The mechanical power taken from the accessory gearbox is transmitted to the differential gears by means of :
- a shaft with a shear section, which limits the torque in case of internal mechanical failure.
- a disconnect mechanism, which enables considerable internal mechanical damage to be avoided in case of failure of the lubrication and cooling oil system.

This mechanism comprises :
- a dog tooth clutch mechanism
- a solenoid pin the disengagement of which is controlled electrically from the flight compartment (Ref. para. 4.A.)

When the pin is retracted, the worm mechanism is engaged and the rotation of the drive shaft disconnects the IDG input shaft from the differential gear shaft.

R NOTE : - the IDG cannot be reconnected in flight
The system can only be reset on the ground, with engines shut down and by manual operation of a reset handle located on the IDG.
- the IDG disconnection must not be performed with engines shut down.

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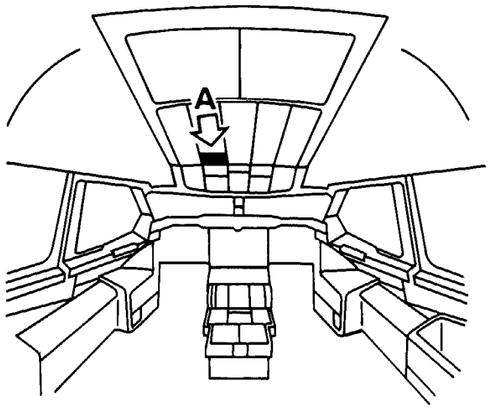

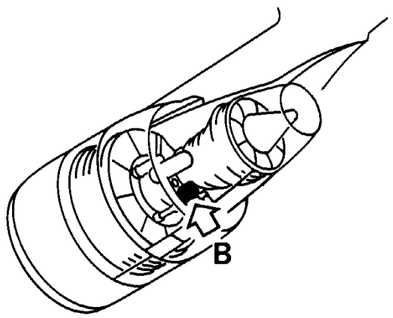

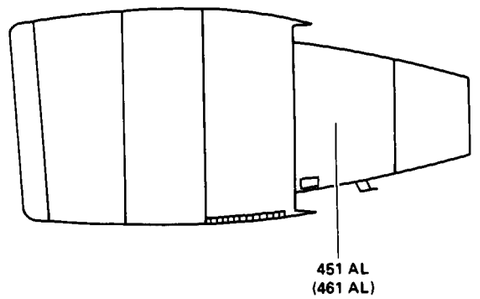

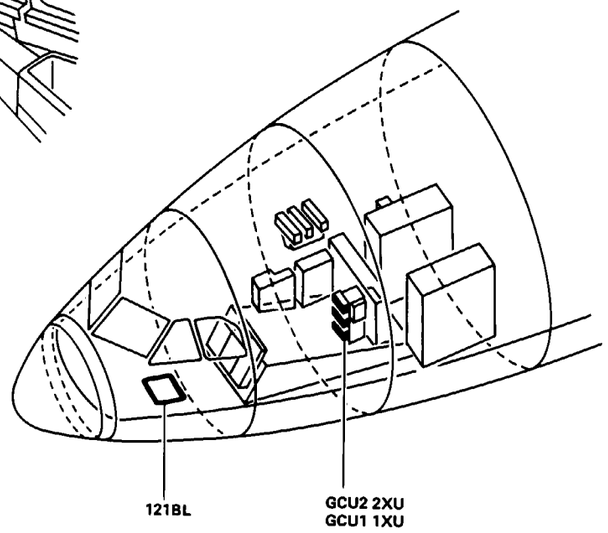

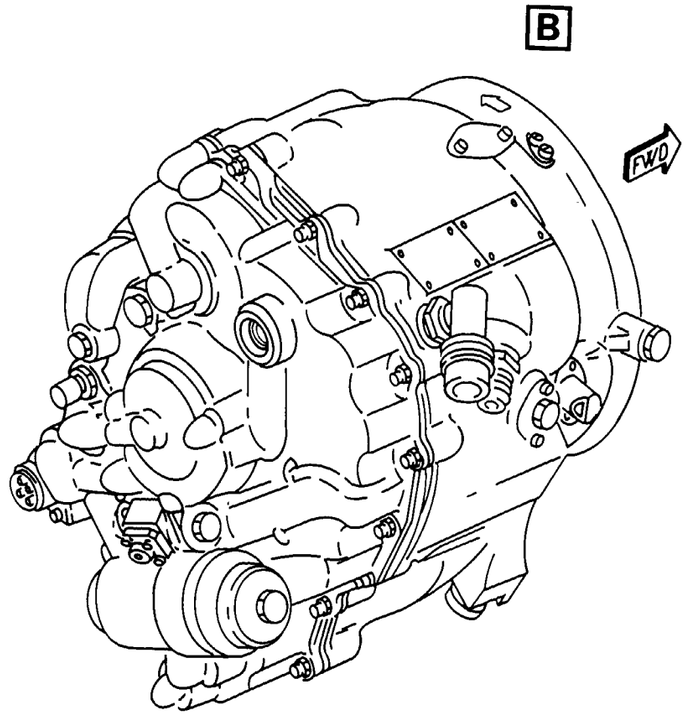

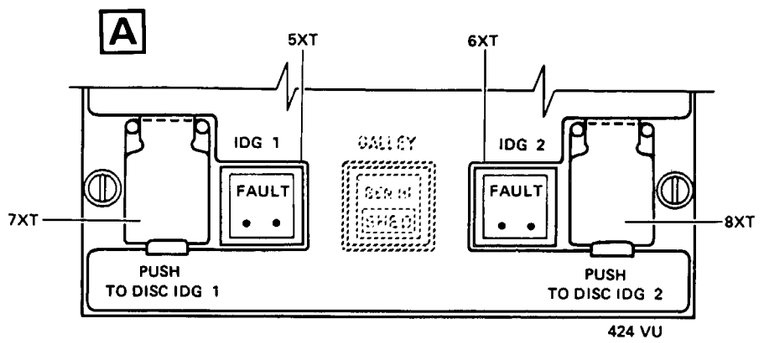

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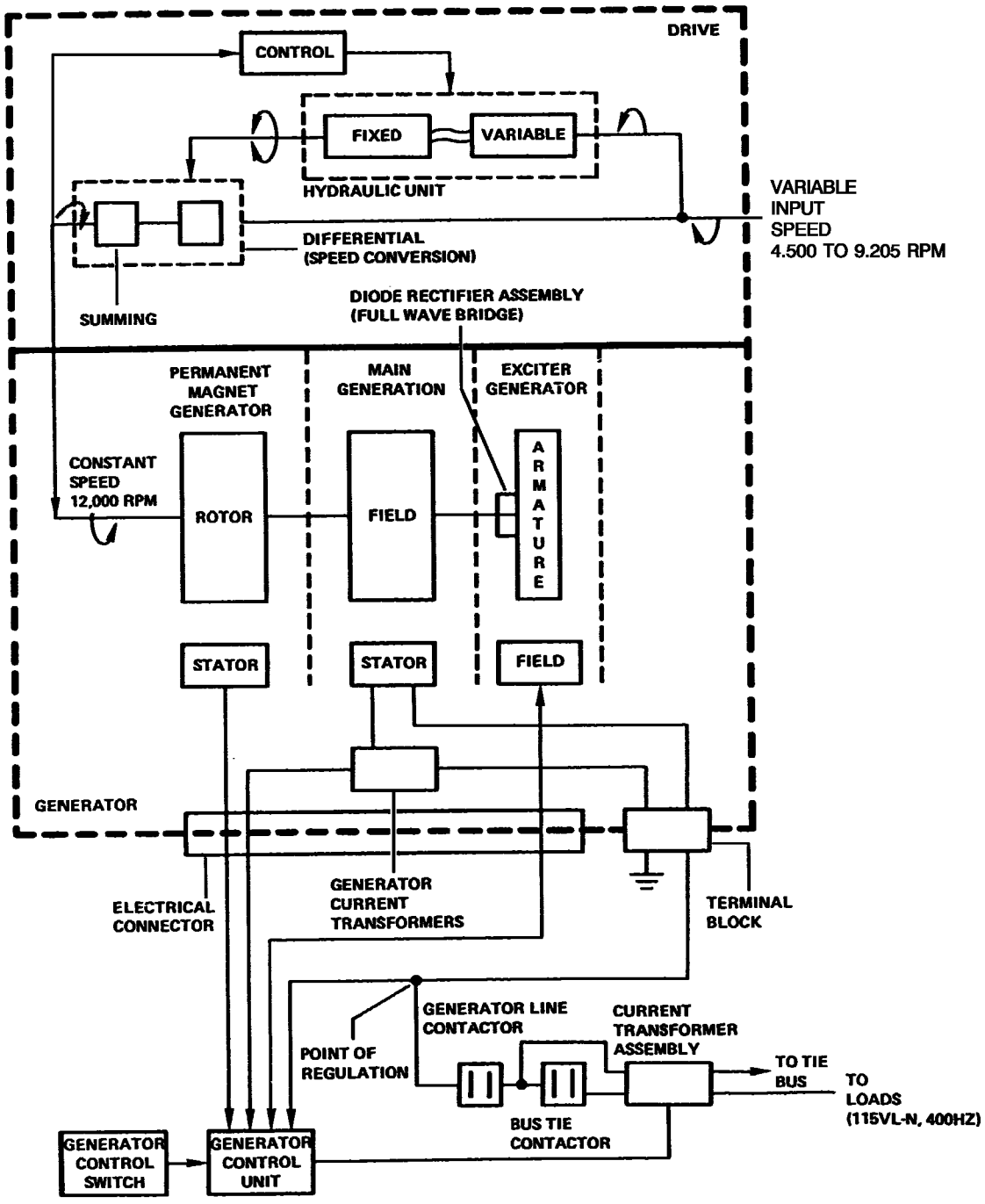
IDG System - Component Location
Figure 001



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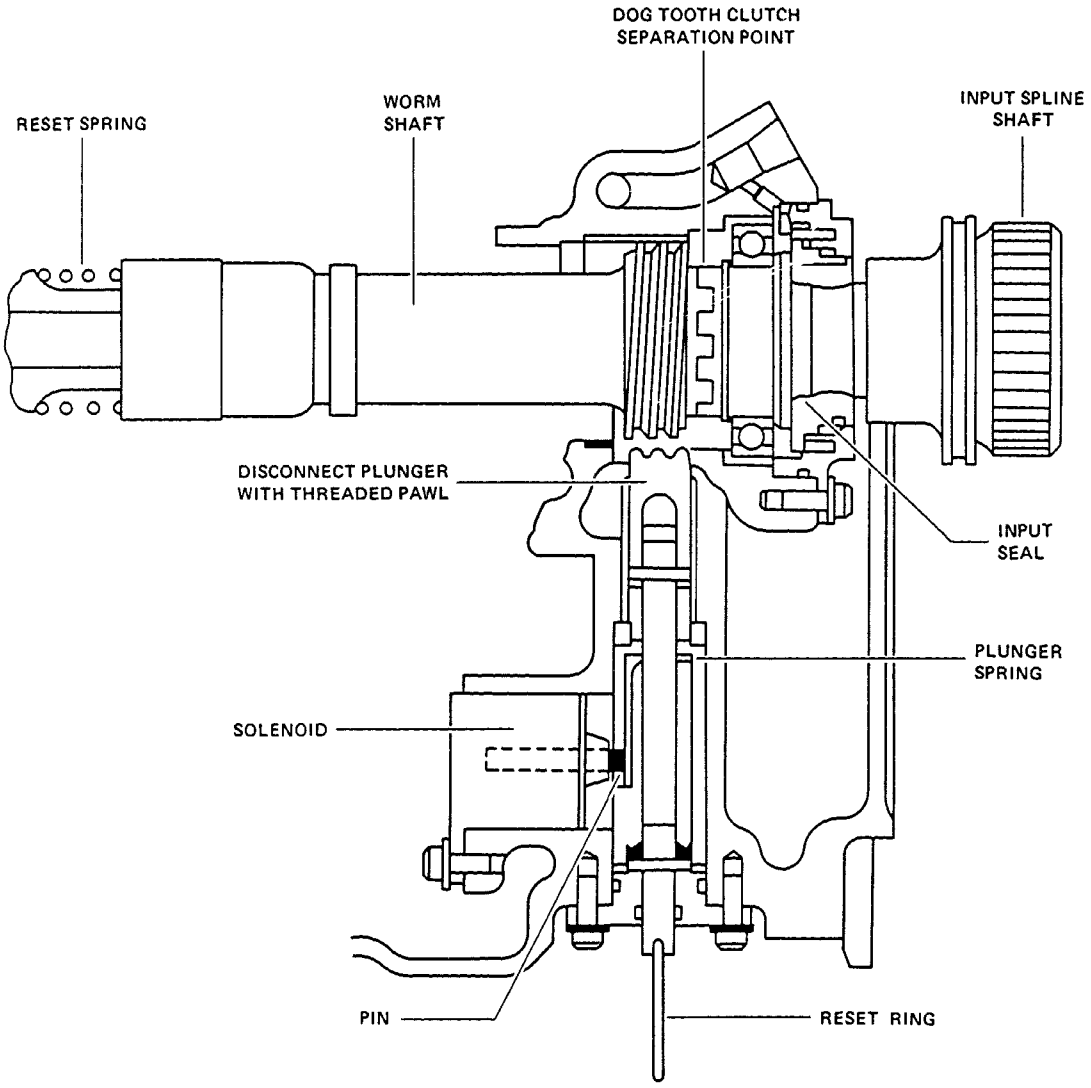
IDG System - IDG Drive and Speed Conversion - Schematic
Figure 002

R



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IDG System - Generator Drive Disconnect Mechanism
Figure 003

R NOTE : Make sure that the IDG does not operate for more than 50 hours
R in the disconnected mode.
R If the IDG operates for 50 hours in the disconnected mode, it will be
R necessary to :
R - replace the IDG
R - send the removed IDG for a shop inspection. There is a risk of
R damage to the ball bearing assembly on the input shaft.

The differential gear train :
- doubles the IDG input speed which is comprised between 4500 and 9075 rpm,
- and adds or subtracts rpm to the doubled input speed to obtain a constant output speed of 12,000 rpm corresponding to the generator drive speed. This is accomplished by the two hydromechanical units through the input ring gear.

The hydraulic trim is composed of two hydromechanical units, so-called fixed and variable, and hydraulically coupled. They operate either as a motor or as a pump.

The so-called fixed unit transmits the compensation to the differential, either plus or minus rotations, as necessary. Finally, the governor detects the differential output speed and controls, the so-called variable unit by means of a control cylinder so that the speed remains constant.

It should be noted that the accessories necessary to the system operation (pressurizing pumps, drainage pump and deaerator) are driven from the differential output, and thus at constant speed.

A speed sensor, located upstream of the disconnect mechanism, transmits IDG input speed information to the generator control unit (GCU) for control purposes (Ref. para.4) and (Ref. 24-22-00, P. Block 1).

4. Tube and Cooling Oil System (Ref. Fig. 004, 005)

The oil drained in the bottom of the IDG casing, is delivered by a vane type pump and through a filter to the external cooling system before returning to the IDG.

R A. Cooling

R The cooling system comprises three series mounted heat exchangers.

R (1)IDG air/oil cooler

R An air/oil heat exchanger is provided for the IDG oil supply. The heat R exchanger receives engine fan exit air via an on/off airflow control R valve. The primary control for this valve is the GCU. It schedules valve R operation as a function of IDG oil temperature and high rotor speed R (N2). The engine control system is capable of overriding the GCU and R opening the IDG air/oil heat exchanger valve. The override is based on R engine oil temperature and high rotor speed (N2). The IDG air/oil heat R exchanger incorporates a solenoid controlled actuator which is powered R by hydraulic pressure supplied by the fuel pump. The solenoid and R actuator are integral with the valve assembly. In the event of a loss of R power or loss of fuel pressure, the valve will move to the fully open R position.

R (Ref. Fig. 006)

Opening of IDG air/oil cooler valve is achieved via a microswitch associated with throttle control lever position in the idle conditions on the ground and in flight, when the throttle lever angle is lower than 10°.

The control is set to open when the IDG inlet oil temperature is equal or greater than $127^{\circ}C$ ($261^{\circ}F$). The valve closes when the inlet oil temperature is equal to or lower than $104^{\circ}C$ ($220^{\circ}F$).

(2)IDG fuel oil cooler

Metered fuel delivered to the fuel nozzles first flows through the engine lubricating oil cooler and then through the IDG oil cooler. Both coolers are assembled in a single unit.

B. Pressurization

After degassing, the oil is pressurized by a vane-type pump, to which is associated a pressure regulating valve.

This pressure is then distributed to provide

- operation of the hydraulic trim and control governor/cylinder assembly
- the lubrication and cooling of the differential generator and various mechanical units.

A pressure switch indicates a drop of pressure in the system (Ref.para.4).

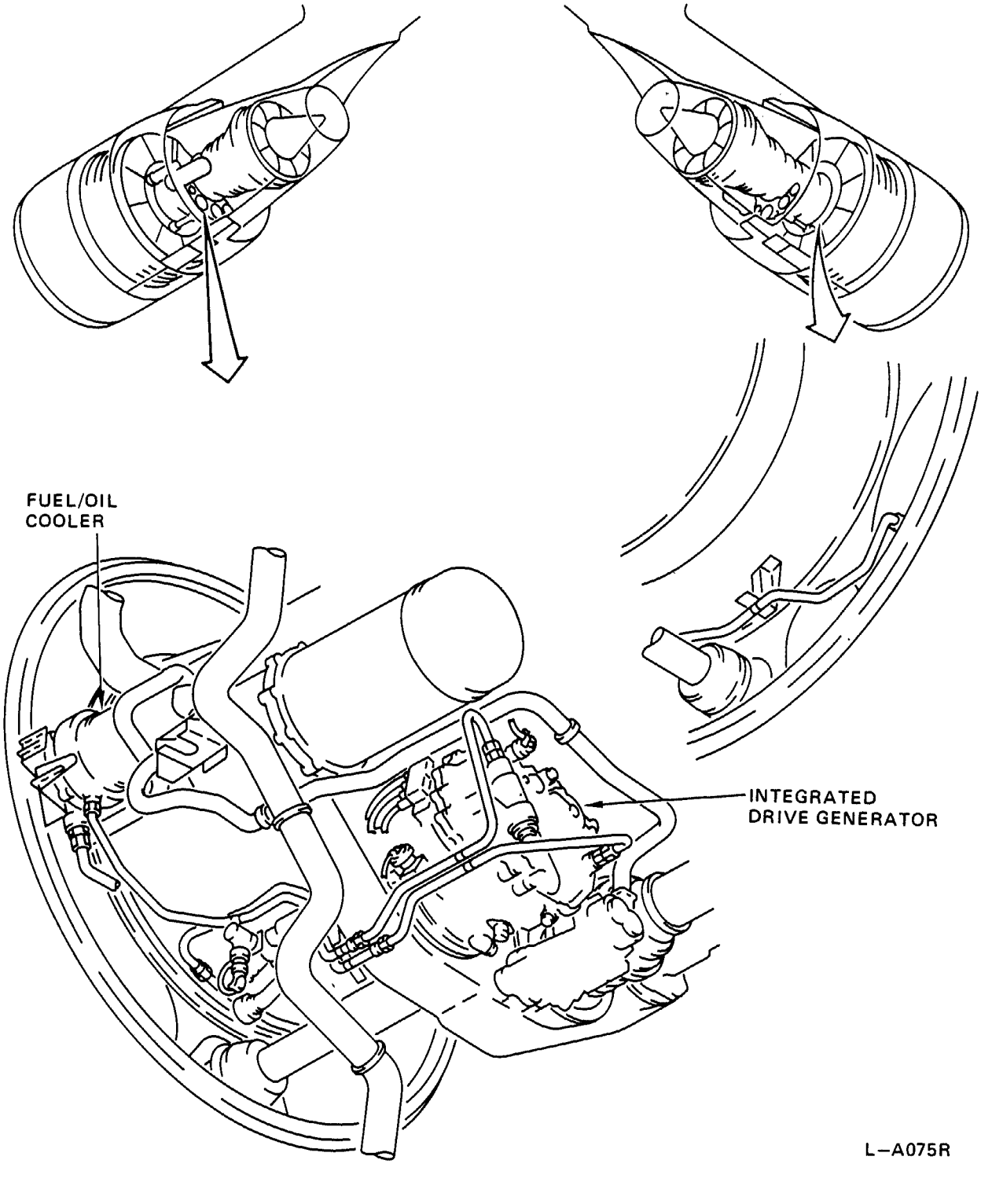
A mechanical pressure differential indicator located on the IDG indicates a filter clogging. A thermal locking device inhibits its activation during cold start.

In case of system clogging a bypass valve protects the drain pump by reducing the pressure produced

A second bypass valve connected between IDG oil input and output enables pressure control in the external system.

This valve is operative during cold start in particular.

An air vent valve compensates for the depressurization created by the pumps when the IDG starts running. After starting this valve closes and the IDG is self-pressurized.



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IDG System - Oil Cooling System
Figure 004

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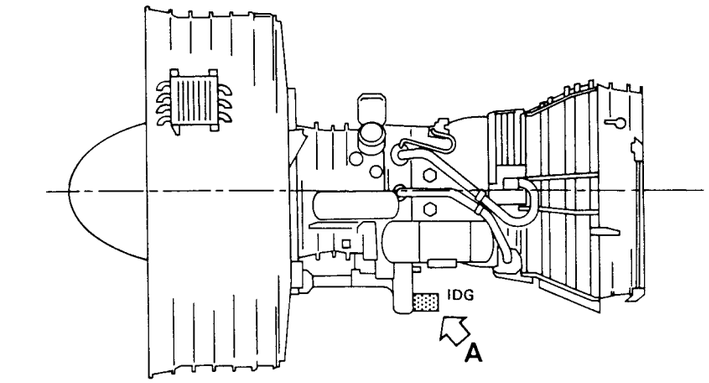

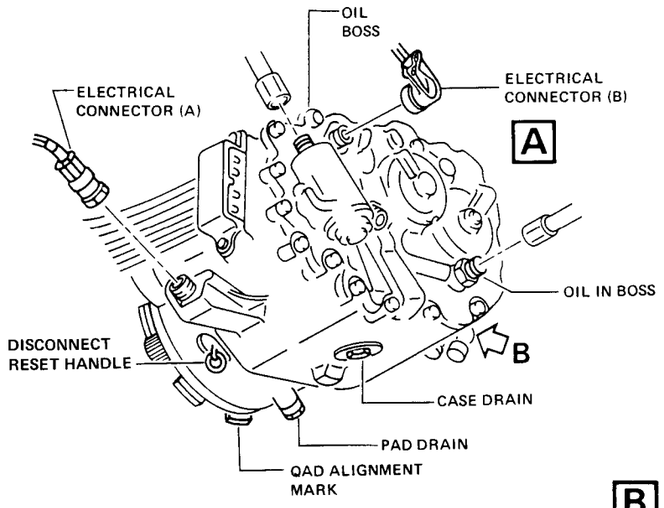

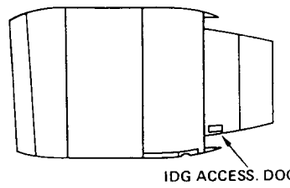

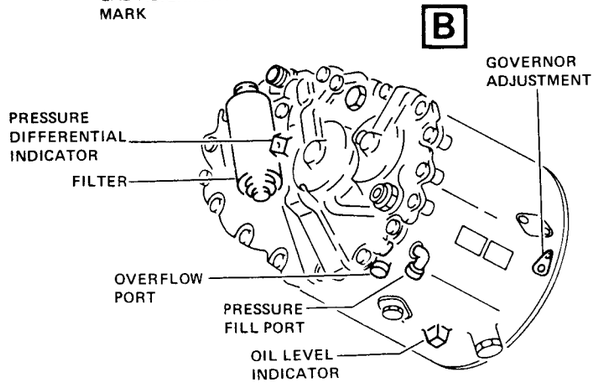

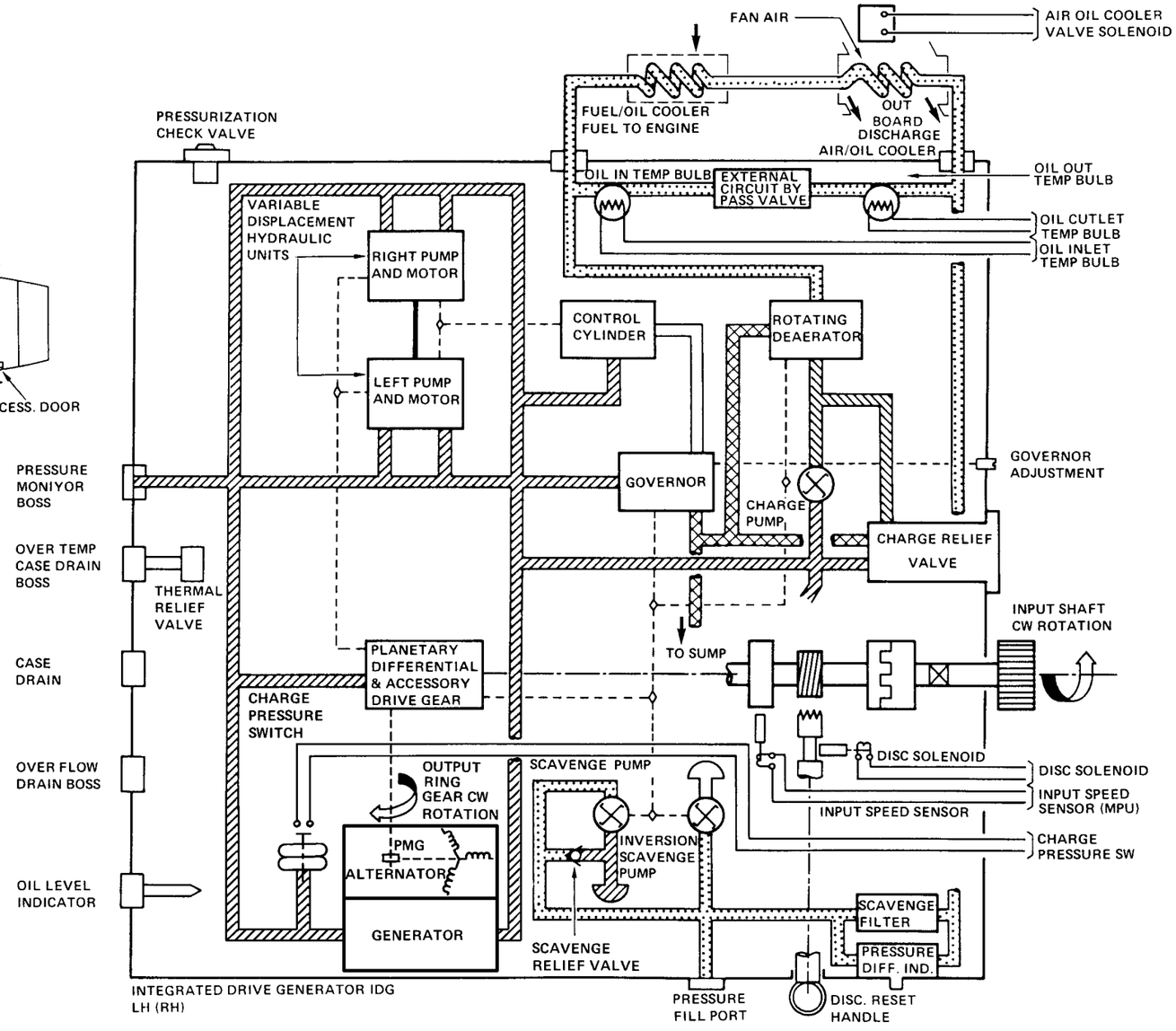

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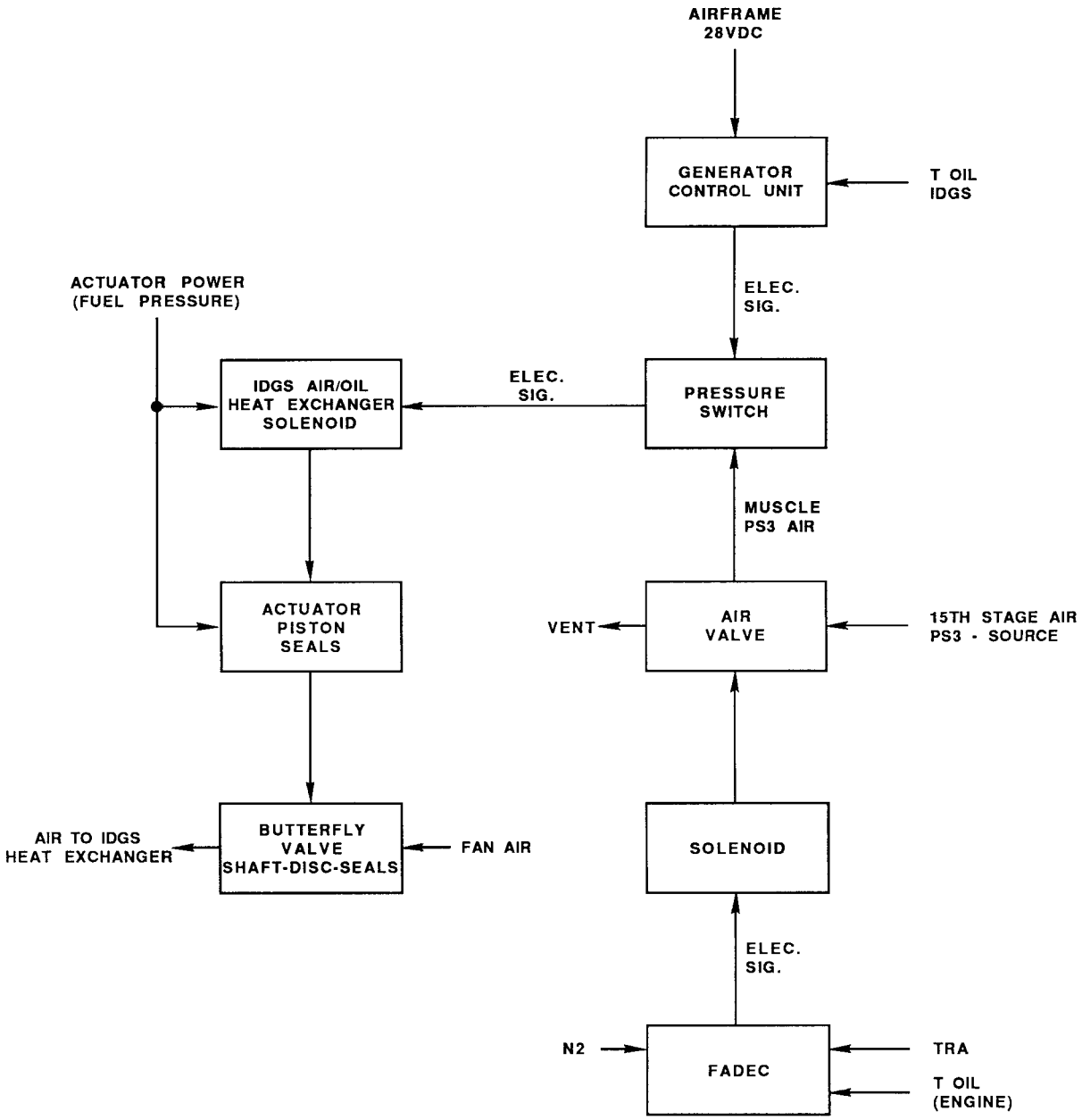
IDG System - Hydraulic Schematic and Component Location
Figure 005

R



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Heat Exchanger System Schematic
Figure 006

R

The IDG servicing and maintenance operations are performed by means of drainage filling and overflow ports an oil level indicator and a direct access to the filter.
Two temperature bulbs enable monitoring of the oil-in and oil-out temperatures (Ref.para.4).

5. Control and Indicating Circuits
(Ref. Fig. 007)
The main parameters related to the IDG drive part operation i.e.
- oil-in and oil-out temperatures
- system low pressure
- drive speed

are permanently monitored by the GCU which controls :
- warnings and indications in the flight compartment
- the fan air supply valve of the cooling system air/oil cooler.

A. Controls and Indications in the Flight Compartment (Ref. Fig. 008)
Amber FAULT legend of ELEC PWR/IDG1 or 2 annunciator (5XT or 6XT) comes on with triggering of the master warning system in case of :
- oil overheat (high outlet temperature)
- oil drop of pressure when it is not due to drive underspeed.

PUSH-TO-DISC IDG1(2) safety guarded pushbutton switch (7XT or 8XT) enables the manual control of the IDG disconnection in case of illumination of FAULT legend.

CAUTION : - IDG DISCONNECTION IS IRREVERSIBLE IN FLIGHT. THE SYSTEM CAN ONLY BE RECONNECTED ON THE GROUND WITH ENGINES SHUT DOWN.
- THE IDG MUST NOT BE DISCONNECTED WITH ENGINES SHUT DOWN.

NOTES : - Illumination of FAULT legend is inhibited at engine shut down (under speed) in particular.
It goes off as soon as the IDG drive speed is lower then 2000 rpm.
- The GCU also provides IDG output oil temperature information to the SDAC (Ref. 31-55-00, P. Block 1 ECAM DATA BOOK)

B. Air/Oil Cooler Air Supply Valve Control (Ref. Fig. 007)
The cooler does not operate permanently it is only used as a help to the cooling system in particular operating conditions.
The air supply valve opens when the IDG oil-in temperature reaches 127°C. The valve closes when the temperature drops below 104°C.

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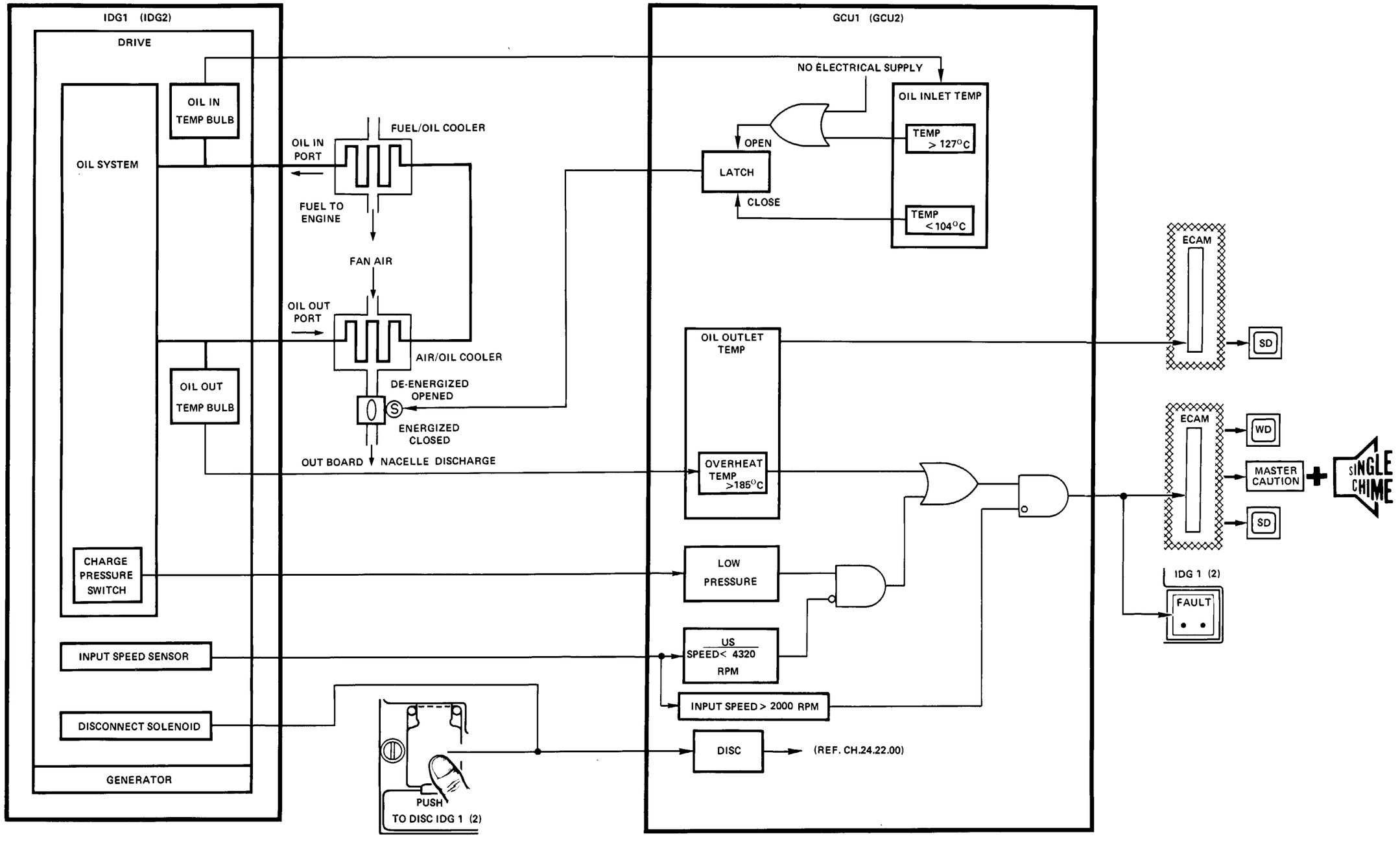

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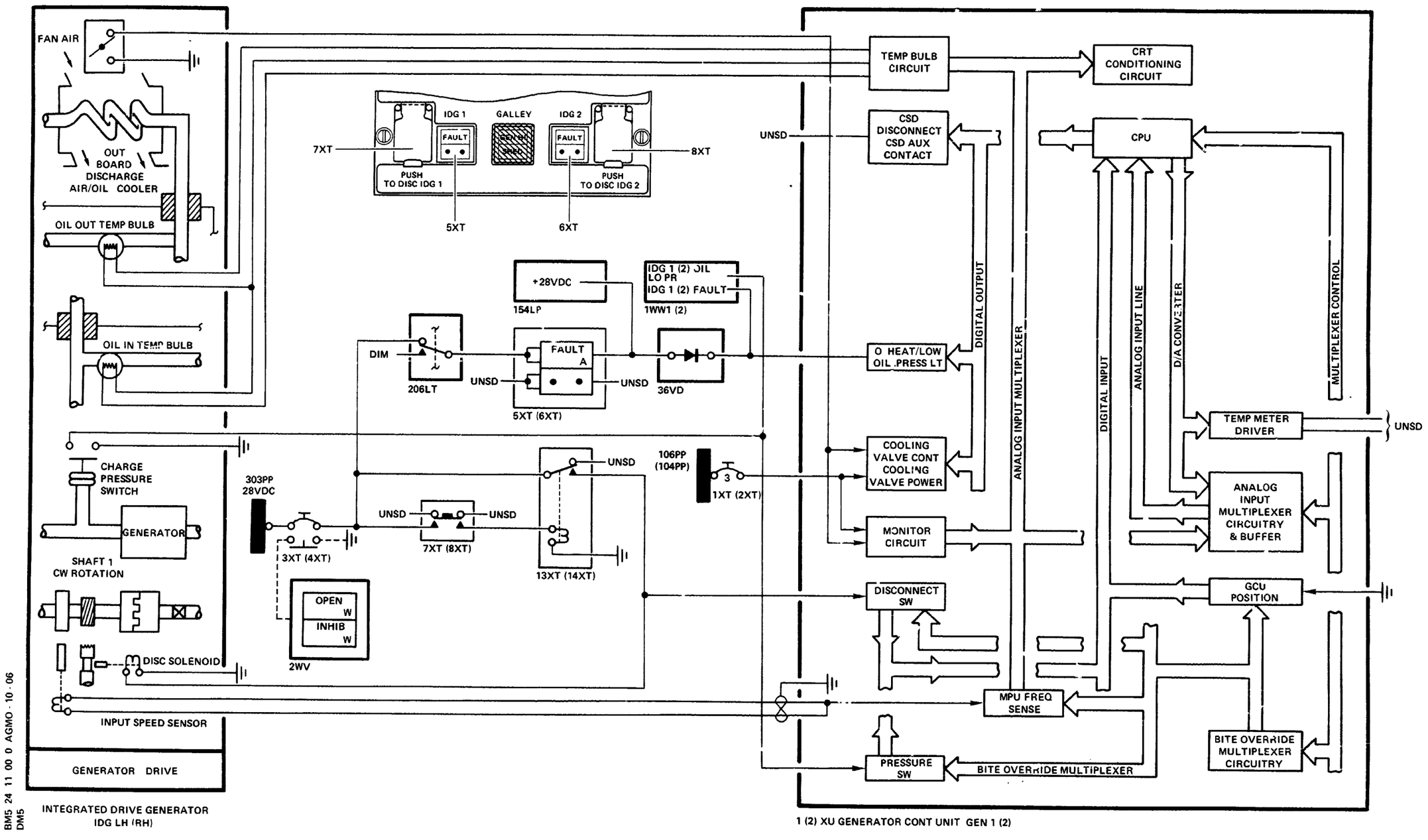
IDG System - Generator Drive Control and Indicating
Figure 007



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IDG System - Control and Indicating in Flight Compartment
Figure 008

6. General Characteristics

This table covers the main characteristics of the IDG drive section.

	General	
	- Input speed	4500/9075 rpm
	- Output speed (Generator rotor)	12000 ± 150 rpm
	- Utilization limits in altitude	-300/13,150 m
	in ambient temperature	-55/177°C
	- Maximum case temperature	177°C
	- Shear section	9000 ± 400 in./lb
	- Disconnect control solenoid :	
	resistance	2.5 Ω at 24°C
	control voltage	17/30VDC
	Oil system	
R	- Oil used	Aeroshell Turbine Oil 555, Type II
R		Aeroshell Turbine Oil 390, Type I
R		Aeroshell Turbine Oil 500, Type II
R		Castrol Oil 5000, Type II
R		Exxon Turbo Oil 25, Type II
R		Exxon Turbo Oil 85, Type II
R		Exxon Turbo Oil 2389, Type I
R		Exxon Turbo Oil 2380, Type II
R		Mobil Jet Oil II, Type II
R		Mobil Jet Oil 254, Type II
R		Royco Turbine Oil 500, Type II
R		Royco Turbine Oil 555, Type II
R		
	- Pump regulated pressure	220/280 psi
	- Cooler system flow rate	14/17 g/mn
	- Cooler bypass valves	250 ± 60 psi
	- Filter bypass valve	350 psi
	- Low pressure switch	140 ± 25 psi
	- Oil capacity (cooler system excluded).	2.8/4.4 l
	- Normal operating temperatures	
	Oil-in	70/105°C
	Oil-out	80/115°C
	- Maximum permissible oil-in temperature (permanent)	127°C
	GCU controls	
	- Overheat	OOT 185 ± 5°C
	- Air/oil cooler air supply valve	
	Opening	OIT > 127 ± 3°C
	Closure	OIT < 104 ± 3°C
	- Drive under speed (low pressure inhibited)	4320 ± 30 rpm
	- Low drive speed (IDG/FAULT legend goes off)	<2000 rpm

POST SB GE24-004

IDG SYSTEM - MAINTENANCE PRACTICES

1. Inspection of the IDG

A. Reason for the Job

This procedure provides Instructions to inspect IDG cable and IDG cable clamps for chafing of molded silastic clamp Insert and/or IDG cable and Temporary repair or replacement.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench
C. RT1146	Tubing
D. RL-6000-SA	Tape
E. Material No.C01-007	Adhesives, Plastics, Sealants (Ref.70-00-00)
F. 190L0F21G	Tape
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 71-52-01, P. Block 401	Engine Core Electrical Harnesses

C. Procedure

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG1	3XT	206/D20
22VU	DISC/IDG2	4XT	206/D21

(b)Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(2)Inspection of IDG power wire harness and attaching clamps

(a)Locate IDG power wire harness (4) on left side of engine core. (Ref. Fig. 201)

R (b)Open quick disconnect clamps (1) attaching IDG power wire harness
R (4) to pneumatic duct brackets (5).
R (c)Open hydraulic case drain filter bracket (2), and engine case
R brackets.
R (d)Remove rubber inserts (3) from clamps and retain.
R (e)Inspect rubber inserts (2) for excessive wear. Discard worn inserts.
R (f)Inspect IDG power wire harness assembly (4) for chafing at clamp locations. If insulation is worn through to conductor and conductor appears damaged IDG power wire harness must be replaced. Proceed to 71-52-01, P. Block 401 for replacement of IDG power wire harness

assembly. If insulation is worn through to conductor and conductor is not damaged a temporary repair can be made to IDG power wire harness assembly. Refer to paragraph 3.C. If insulation on IDG power wire harness assembly is not damaged, IDG power wire harness is acceptable. Proceed to paragraph 3.D. Install clamps on harness in accordance with 71-52-01, P. Block 401.

(Ref. Fig. 201)

(Ref. Fig. 202)

(3)Temporary repair of IDG power wire harness assembly

(Ref. Fig. 203)

(a)Remove IDG power wire harness assembly (1) from power plant in accordance with 71-52-01, P. Block 401.

Pre SB ROHR 24-015

(b)Note and mark location of wires running through wire support fairlead (2). Mark wires and fairlead.

(c)Remove two nuts (3), four washers (4), and two bolts (5) attaching the wire support fairlead (2) to IDG power wire harness assembly (1).

End Pre SB ROHR 24-015

(d)Note location and positioning of all string tying tape on IDG power wire harness assembly (1) and remove.

NOTE : If RT1146 heat shrink tubing is unavailable use RL6000-SA series tape. Apply to chafed areas by slightly stretching tape during application. Wrap with a 50 % overlap 3 layers thick.

(e)Measure lengths of chafing damage on lead or leads of IDG power wire harness assembly (1). Cut a piece of RT1146 1.0 inch (25.4 mm) diameter heat shrink tubing 1.0 inch (25.4 mm) longer than damaged area for each of the damaged areas on wire harness assembly.

(f)Slide heat shrink tubing over terminal lugs to damaged areas. Overlap each damaged area on wire harness leads by 0.50 inch (12.7 mm).

(g)Shrink RT1146 heat shrink tubing to cover damaged areas using a heating gun.

(h)Position wire harness leads on power wire harness assembly (1) into wire support fairlead (2) at locations noted in paragraph 3.C. (2). Attach with two bolts (5), four washers (4), and two nuts (3). TORQUE nuts to between 20 and 25 lbf. in. (0.23 and 0.28 m. daN).

(i)String tie entire IDG power wire harness assembly (1) in an interwoven pattern using 19OLOF21G tying tape at locations noted in paragraph 3.C.(4).

(j)Install repaired IDG power wire harness assembly (1) in accordance with 71-52-01, P. Block 401.

(Ref. Fig. 203)

(4)Close-up

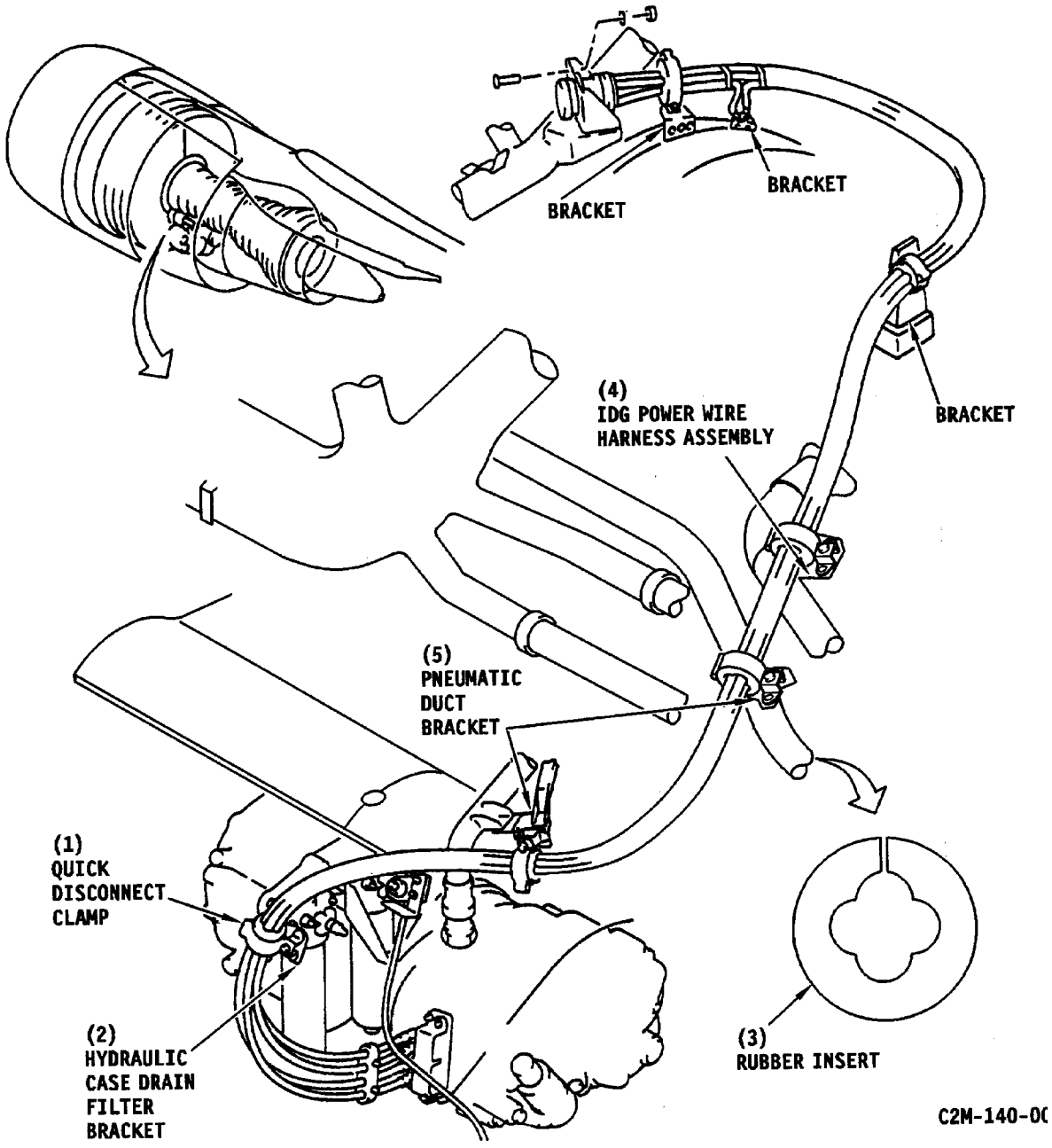
(a)Remove safety clips and tags and close circuit breakers 3XT and 4XT.

(b)Close LH thrust reverser door (Ref.71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers for the appropriate engine.

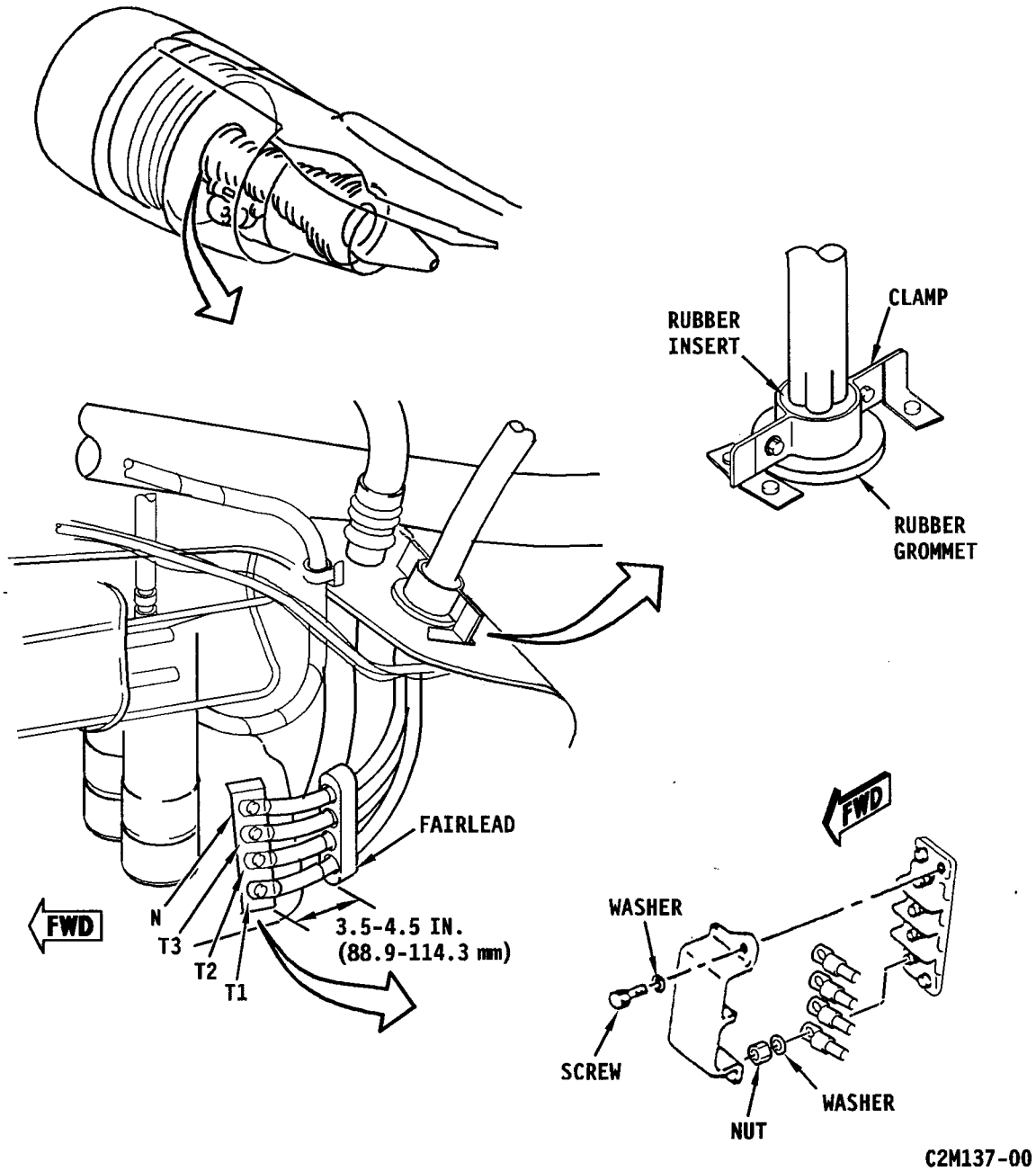
End Post SB GE 24-004

2. Preservation of the IDG

A. Reason for the Job



Inspection of Clamps and Harness
Harness with Connector VC 4955J
Figure 201



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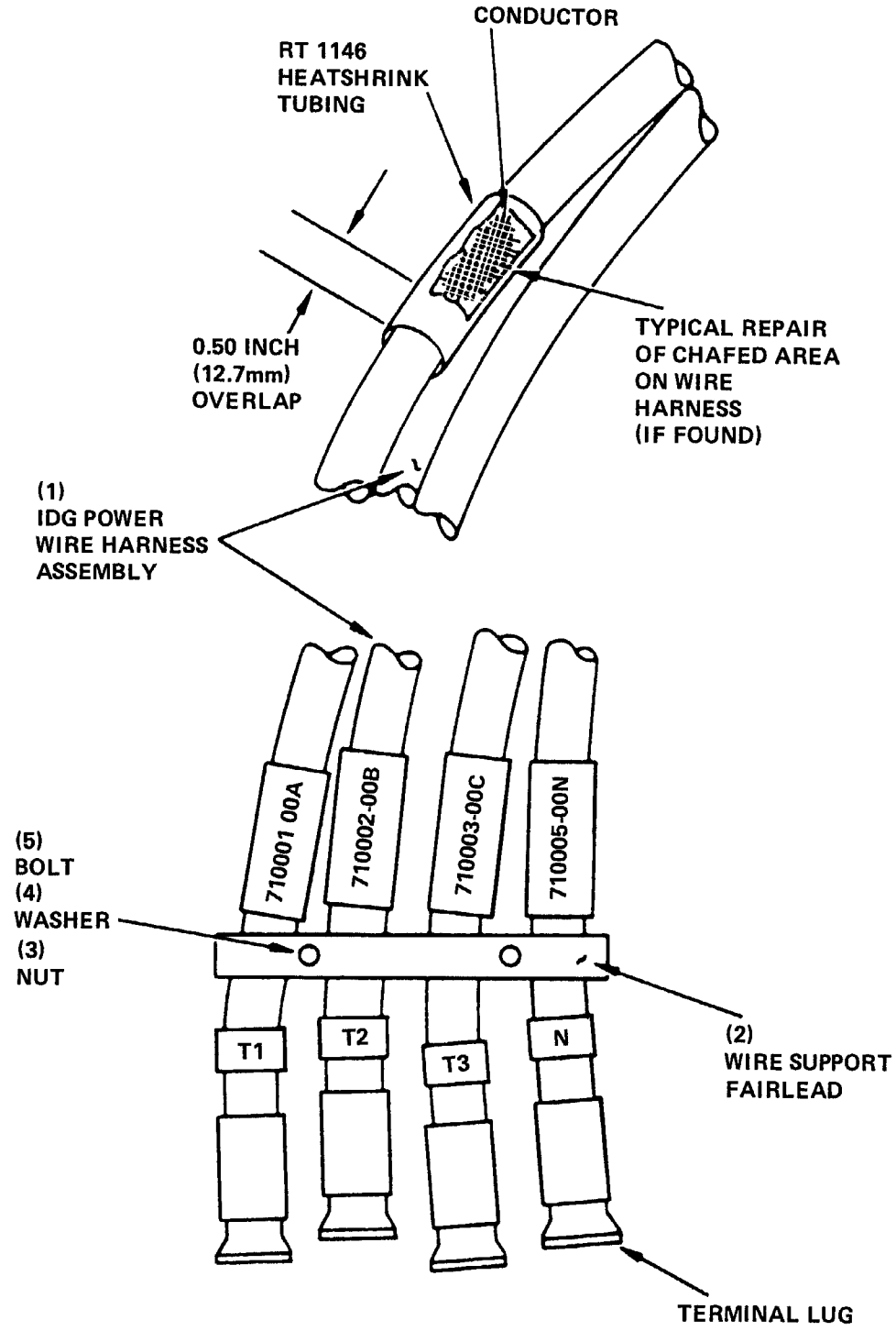
Inspection of Clamps and Harness
Post SB ROHR 24-015
Figure 202



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Repair of IDG Power Wire Harness Assembly
Figure 203

Preservation of the IDG prevents corrosion and deterioration when the IDG is in storage for a short period (less than two years).
The preservation procedure will give maximum protection to the IDG. You must do it in clean and dry conditions.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Adhesive Tape
B. Material No. 15-009	Storage Preservation (Ref. 20-31-00)
Referenced Procedures	
- 12-13-34, P. Block 1	Electrical Power
- 24-11-00, P. Block 301	IDG System
- 24-11-11, P. Block 401	IDG System
- 71-00-00, P. Block 501	Power Plant General
- 71-13-00, P. Block 301	Cowl Doors

C. Job Set-Up
(1)Get access.
(a)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).

D. procedure
(1)IDG preservation
(a)Remove the IDG (Ref. 24-11-11, P. Block 401).
(b)Do an inspection of the external surfaces of the IDG for missing paint.
1 If necessary, return the IDG to the overhaul facility to repair the paint work.
(c)Protection of the IDG.
1 Apply adhesive tape on the input spline, the O-ring, the input seal area and the valves that are on the periphery of the input pad. Do not remove the input flange, gasket or screws.
2 Apply storage preservation (Material No. 15-009) on the input face and the input pad area.
3 Remove the adhesive tape.
(d)Install the IDG (Ref. 24-11-11, P. Block 401)
(e)Replace the IDG filter (Ref. 24-11-11, P. Block 301)
(f)Fill the IDG with oil (Ref. 12-13-24, P. Block 1)
(g)Start the engine to make sure that oil flows through the IDG and the external circuit (Ref. 71-00-00, P. Block 201).
(h)Open the drains of the input pad seal to drain unwanted fluids (condensation water or remaining engine washing fluids).
(i)At intervals, do an inspection for external corrosion damge.
Do steps 1 to 3 again as necessary.
NOTE : We recommend that you do this inspection:
- a minimum of one time each year or
- when you do usual engine maintenance and/or inspections.
But it is possible to change the frequency of the intervals (use your experience and the location of storage to make the decision).

(2)Return to service.
(a)Do an visual inspection of all the external surfaces of the IDG for damage.
(b)Drain the IDG (Ref. 12-13-24, P. Block 1).
(c)Replace the filter (Ref. 24-11-00, P. Block 301).
(d)Fill the IDG (Ref. 12-13-24, P. Block 1)
(e)Start the engine to make sure that the IDG operates correctly (Ref. 71-00-00, P. Block 201).

E. Close-Up
(1)Close access.
(a)Make sure that the work area is clean and clear of tools and other items.
(b)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

1. Preservation of the IDG

A. Reason for the Job

Preservation of the IDG prevents corrosion and deterioration when the IDG is in storage for a short period (less than two years).
The preservation procedure will give maximum protection to the IDG. You must do it in clean and dry conditions.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Adhesive Tape
B. Material No. 15-009	Storage Preservation (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 301	IDG System
- 24-11-11, P. Block 401	IDG System
- 71-00-00, P. Block 501	Power Plant General
- 71-13-00, P. Block 301	Cowl Doors

C. Job Set-Up

(1)Get access.
(a)Open the fan cowl doors (Ref. 71-13-00, P. Block 301).

D. Procedure

(1)IDG preservation
(a)Remove the IDG (Ref. 24-11-11, P. Block 401).
(b)Do an inspection of the external surfaces of the IDG for missing paint.
1 If necessary, return the IDG to the overhaul facility to repair the paint work.
(c)Protection of the IDG.
1 Apply adhesive tape on the input spline, the O-ring, the input seal area and the valves that are on the periphery of the input pad. Do not remove the input flange, gasket or screws.
2 Apply storage preservation (Material No. 15-009) on the input face and the input pad area.
3 Remove the adhesive tape.
(d)Install the IDG (Ref. 24-11-11, P. Block 401).
(e)Replace the IDG filter (Ref. 24-11-00, P. Block 301).
(f)Fill the IDG with oil (Ref. 12-13-24, P. Block 1).
(g)Start the engine to make sure that oil flows through the IDG and the external circuit (Ref. 71-00-00, P. Block 201).
(h)Open the drains of the input pad seal to drain unwanted fluids (condensation water or remaining engine washing fluids).
(i)At intervals, do an inspection for external corrosion damage. Do steps 1 to 3 again as necessary.
NOTE : We recommend that you do this inspection:
- a minimum of one time each year or

- when you do usual engine maintenance and/or inspections. But it is possible to change the frequency of the intervals (use your experience and the location of storage to make the decision).

(2)Return to service.

(a)Do a visual inspection of all the external surfaces of the IDG for damage.

(b)Drain the IDG (Ref. 12-13-24, P. Block 1).

(c)Replace the filter (Ref. 24-11-00, P. Block 301).

(d)Fill the IDG (Ref. 12-13-24, P. Block 1).

(e)Start the engine to make sure that the IDG operates correctly (Ref. 71-00-00, P. Block 201).

E. Close-Up

(1)Close access.

(a)Make sure that the work area is clean and clear of tools and other items.

(b)Close the fan cowl doors (Ref. 71-13-00, P. Block 301).

1. Reason for the Job

NOTE : If the IDG is operated for 50 hours in the disconnected mode without reconnecting, remove the IDG for shop inspection of the input shaft ball bearing assembly.

IDG servicing comprises the following procedures :

A. IDG Oil Drainage and Replenishing (Ref. 12-13-24, P. Block 1)

B. Replacement of the Scavenge Filter

C. Servicing of the IDG after Oil Chemical Contamination

D. IDG Oil - Type Change

2. Replacement of the Scavenge Filter

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Oil (Ref. 12-13-24)
(3)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(4)	Lockwire dia 0.032 in.
(5)Material No. 04-008	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-32-24, P. Block 301	Electrical Power
- 12-13-24, P. Block 1	Sampling of the IDG Oil for Analysis
- 24-11-00, P. Block 601	IDG System
- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
- 24-11-25, P. Block 401	Main Fuel/Oil Heat Exchanger
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(3)Place container under IDG.

C. Removal

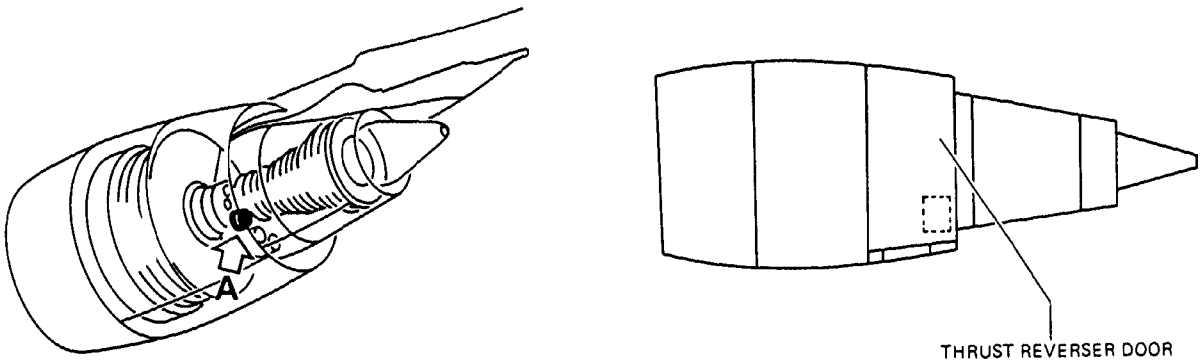
(Ref. Fig. 301)

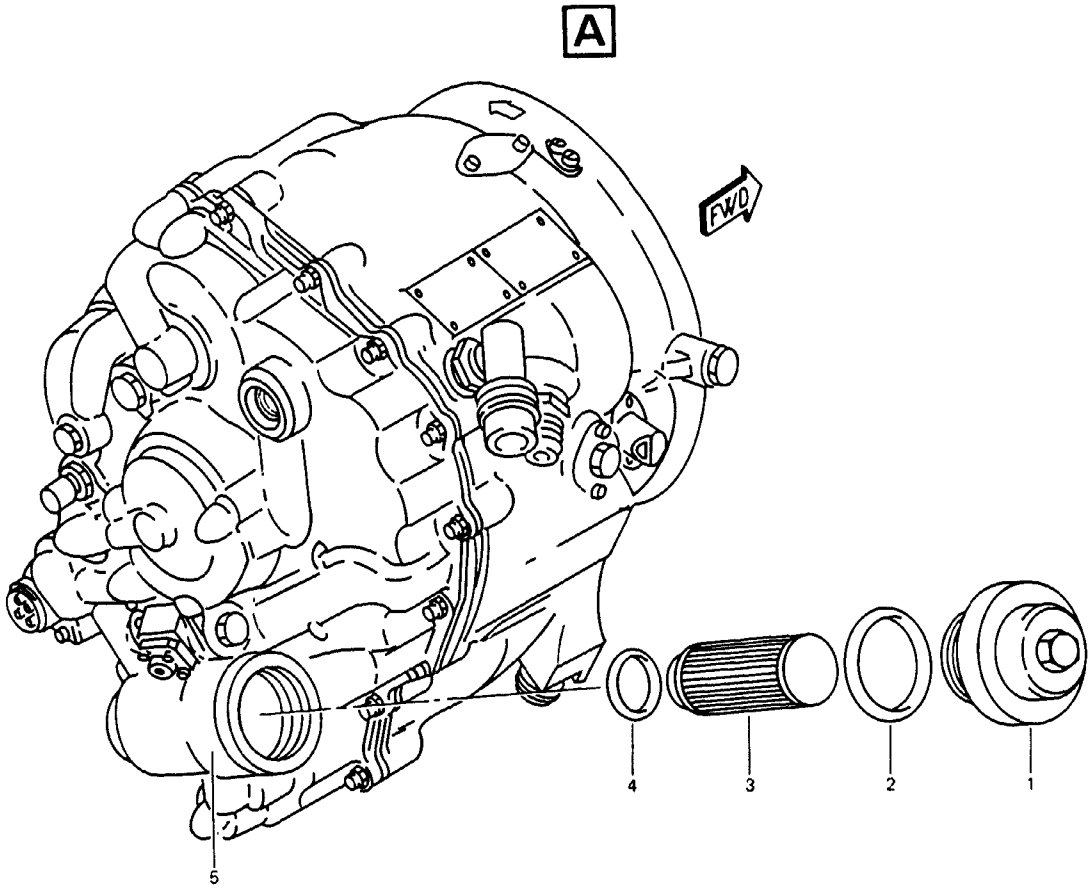
WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

(1)Depressurize IDG by connecting drain line to overflow drain valve or depressurize IDG by pressing the "PUSH TO VENT valve" (if still installed) for approximately 15 seconds.
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.
(2)Cut and remove lockwire from filter cover.
(3)Remove cover (1) from filter bowl (5).
(4)Remove filter element (3). Discard the two O-rings (2) and (4).

D. Check of the Oil Filter
(1)If you smell a fuel odour from the filter element or filter cover, do the servicing of the IDG after chemical contamination (Ref. 24-11-00, P. Block 301 para. 3.).
(2)If you think that the condition of the oil in the filter element or on the filter cover is not correct, do a sampling of the IDG (Ref. 12-32-24, P. Block 301).
(3)If the removed filter element shows deposits, replace it.
(4)If bright metal deposits are present on the filter element, a deposit analysis is required :
(a)Bright metal particles, chips or flakes which can be clearly defined as chunks or pieces caused by breakage, remove IDG and return it to the overhaul facility.
(b)If non-magnetic bright metal particles are present in considerable quantity on the filter element or in drained oil, examine oil coolers to make certain that oil system is not contaminated. Remove IDG and return it to the overhaul facility.
(c)A moderate number of non-magnetic scattered small metallic flakes (bronze or silver-colored metal) or of flakes of generator insulation produced by normal wear are permitted.
(d)A considerable number of non-metallic items such as black epoxy chips, sleeving and other form of generator insulation should not necessitate removal of the IDG in the absence of metallic evidence. Examine oil coolers to make certain that oil system is not contaminated.
CAUTION : DO NOT CLEAN OR REPLACE FILTER IF THE IDG IS RETURNED TO THE OVERHAUL FACILITY.
(e)If the IDG is being removed for any cause or for a pressure differential indicator extended red button, remove the scavenge filter and check for damage, collapse, or indications that contaminated oil is bypassing the filter and entering the external circuit.
If the filter is damaged, collapsed, or shows sign of bypassing :
- remove and replace the external coolers,
- replace air/oil heat exchanger (Ref. 24-11-21, P. Block 401),
- replace fuel/oil heat exchanger (Ref. 24-11-25, P. Block 401),
- and clean the external line (Ref. 24-11-00, P. Block 701).

E. Installation
CAUTION : DO NOT CLEAN AND USE AGAIN A FILTER ELEMENT THAT YOU REMOVED.
CAUTION : MAKE CERTAIN FILTER COMPONENTS ARE SEATED IN THE IDG SCAVENGE





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IDG System Scavenge Filter
Figure 301

FILTER CAVITY BEFORE INSTALLING FILTER COVER. THE FILTER COMPONENTS MAY BE DAMAGED IF NOT PROPERLY INSTALLED. DO NOT FORCE FILTER COMPONENTS INTO HOUSING BY TIGHTENING FILTER COVER.

(1)Lubricate new O-ring (4) with Material No. 04-008 or oil and install it on replacement filter element (3).
(2)Install filter assembly into filter bowl (5).
(3)Install O-ring (2) in cover (1).
(4)Install cover (1) on filter bowl (5) and TORQUE to between 13 and 15 lbf.ft. (1.76 and 2.34 m.daN). Wirelock.
(5)Replenish IDG oil (Ref. 12-13-24, P. Block 1).
(6)Perform dry motoring test following "Type of Testing after Engine Component Replacement" (Ref. 71-00-00, P. Block 501).

F. Close-Up
(1)Remove safety clips and tags and close circuit breakers 3XT and 4XT.
(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers for the appropriate engine.

3. Servicing of the IDG after Oil Chemical Contamination

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Circuit Breaker Safety Clips
(3)	Torque Wrench
(4)	Oil (Ref. 12-13-24)
(5)98A12001017000	Tank-Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(6)	Lockwire dia 0.032 in
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors
- 12-13-24, P. Block 1	Electrical Power
- 24-11-25, P. Block 401	Fuel Hoil Heat Exchanger

B. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(3)Place container under IDG.

C. Procedure

(Ref. Fig. 302)

NOTE : If the cause of the contamination is fuel leaks:
- replace fuel/oil heat exchanger (Ref. 24-11-25, P. Block 401).

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

(1) Drain IDG as per 12-13-24, P. Block 1.

NOTE : The color of the oil which flows from the case drain and the color of the oil put into the IDG must be the same, or collect 1 USgal (3.8 l) to 1.5 USgal (5.7 l) of oil from the case drain.

(2) Allow oil from cooling system to drain into a suitable container by disconnecting oil-in and oil-out lines from fittings on IDG.

CAUTION : USE DOUBLE-WRENCH METHOD WHEN TORQUING OIL-IN AND OIL-OUT LINES. IF THE DOUBLE-WRENCH METHOD IS NOT FOLLOWED, EXCESS TORQUE MAY BE TRANSFERRED TO INTEGRATED DRIVE GENERATOR FITTINGS, RESULTING IN DAMAGE TO INTEGRATED DRIVE GENERATOR BOSSES.

(3) Connect oil-in line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(4) Connect oil-out line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(5) Replenish IDG as per 12-13-24, P. Block 1.

(6) Run engine until IDG oil temperature reaches 175°F (79.4°C) minimum (Ref. 71-00-00, P. Block 501).

(7) Drain IDG as per 12-13-24, P. Block 1.

NOTE : The color of the oil which flows from the case drain and the color of the oil put into the IDG must be the same, or collect 1 USgal (3.8 l) to 1.5 USgal (5.7 l) of oil from the case drain.

(8) Allow oil from cooling system to drain into a suitable container by disconnecting oil-in and oil-out lines from fittings on IDG.

(9) Replace scavenge filter as per para 2.

(10) Connect oil-in line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(11) Connect oil-out line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(12) Replenish IDG as per 12-13-24, P. Block 1.

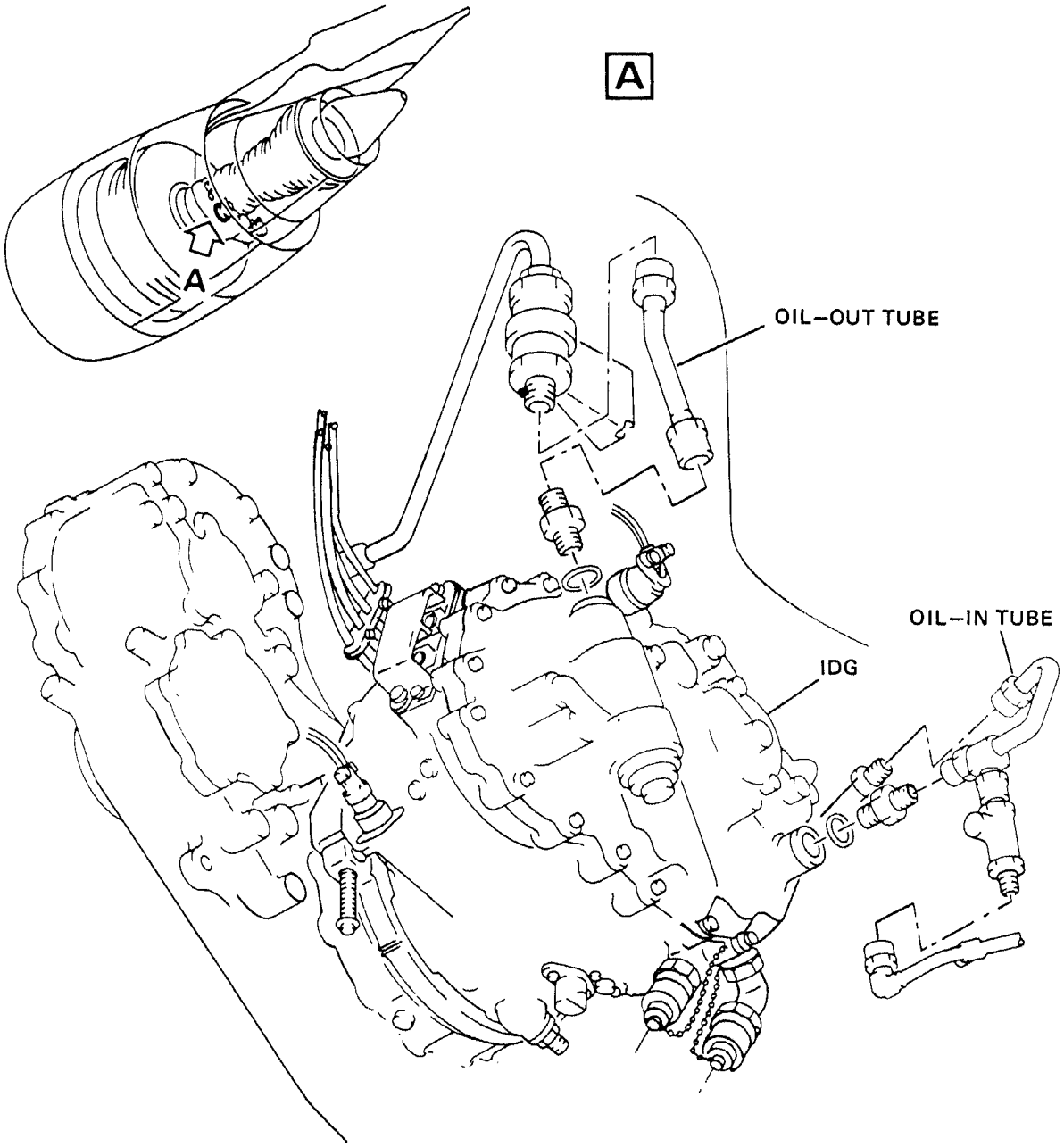
D. Close-Up

(1) Remove safety clips and tags and close circuit breakers 3XT and 4XT.

(2) Close LH thrust reverser door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers for the appropriate engine.

4. IDG Oil - Type Change

A. Equipment and Materials



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IDG System - Oil-In and Oil-Out Lines to the IDG
Figure 302

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Circuit Breaker Safety Clips
(3)	Torque Wrench
(4)	Oil (Ref. 12-13-24)
(5)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(6)	Lockwire dia. 0.032 in.
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

C. Procedure

(Ref. Fig. 303)

(1)Drain IDG (Ref. 12-13-24, P. Block 1) and do not install case drain plug (3) again.

(2)Replace IDG scavenge filter as per Para. 2.

(3)Flushing of the IDG

NOTE : Approximately 3.8L (1 USgal) of oil flow into the container.

(a)Remove dust cap from pressure fill valve (1).

(b)Connect pressure fill hose (4) to pressure fill valve (1).

(c)Use a pump to fill IDG with filtered oil until :

- the color of the oil that flows from the case drain is the same as the color of the oil that you put inot the IDG or
- you collect 3.8L (1 USgal) of oil from the case drain.

(4)Installation of the case drain plug

(a)Lubricate new O-ring (2) with oil.

(b)Install new O-ring (2) on case drain plug (3).

(c)Install case drain plug (3).

(d)TORQUE case drain plug (3) to between 55 lbf.in. and 75 lbf.in. (0.56 m.daN and 0.85 m.daN).

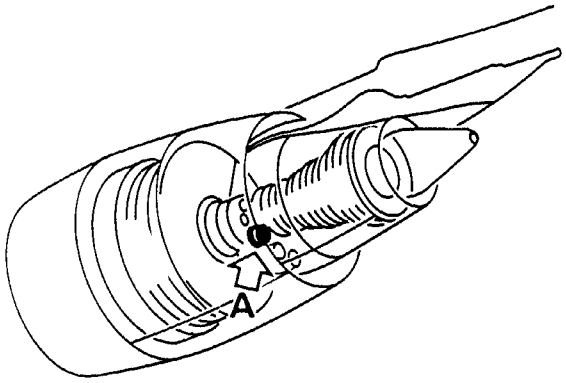
WARNING : WEAR GOGGLES WHEN YOU INSTALL LOCKWIRE.

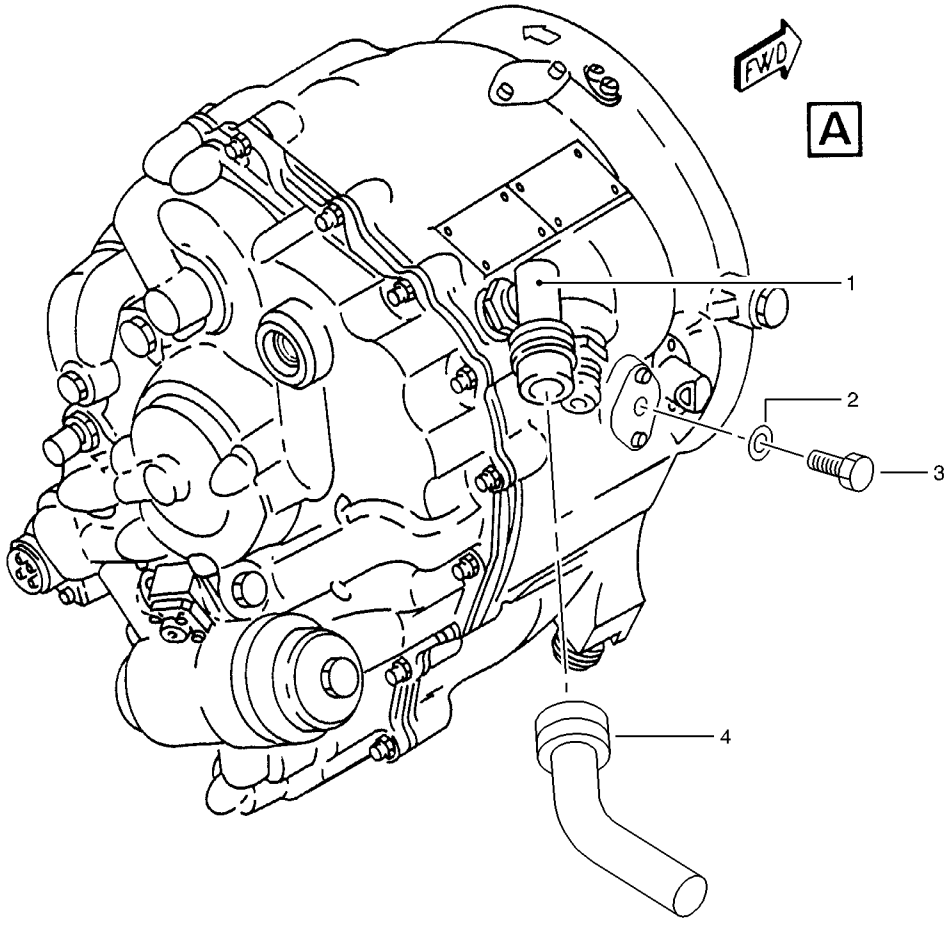
(e)Safety case drain plug (3) with lockwire.

(5)Replesnish IDG with oil (Ref. 12-13-24, P. Block 1).

(6)Close access.

(a)Make sure that the work area is clean of tools and other items.





NOTE: IDG IS ROTATED TO SHOW BOTTOM VIEW

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IDG Oil-Type Change
Figure 303

R

(b)Remove safety clips and tags and close circuit breakers 3XT and 4XT.
(c)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(7)Do a dry motoring (Ref. 71-00-00, P. Block 501) and make sure that there are no leaks at the cover of the IDG scavenge filter.

NOTE : We recommended that you do a visual inspection to make sure that there are no leaks at the cover of the IDG scavenge filter. Do this inspection at the subsequent engine start, at minimum idle (Ref. 71-00-00, P. Block 501).
At this time, the oil pressure in the lubrication system and the cooling system of the IDG is higher and the oil circulation time is longer.

(8)Do an inspection of the oil level (Ref. 24-11-00, P. Block 601).

1. Reason for the Job

NOTE : If the IDG is operated for 50 hours in the disconnected mode without reconnecting, remove the IDG for shop inspection of the input shaft ball bearing assembly.

IDG servicing comprises the following procedures :

A. IDG Oil Drainage and Replenishing (Ref. 12-13-24, P. Block 1)

B. Replacement of the Scavenge Filter

C. Servicing of the IDG after Oil Chemical Contamination

D. IDG Oil - Type Change

2. Replacement of the Scavenge Filter

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Oil (Ref. 12-13-24)
(3)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(4)	Lockwire dia 0.032 in.
(5)Material No. 04-008	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-32-24, P. Block 301	Sampling of the IDG Oil for Analysis
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
R - 79-21-05, P. Block 401	Fuel/Oil cooler
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(3)Place container under IDG.

C. Removal

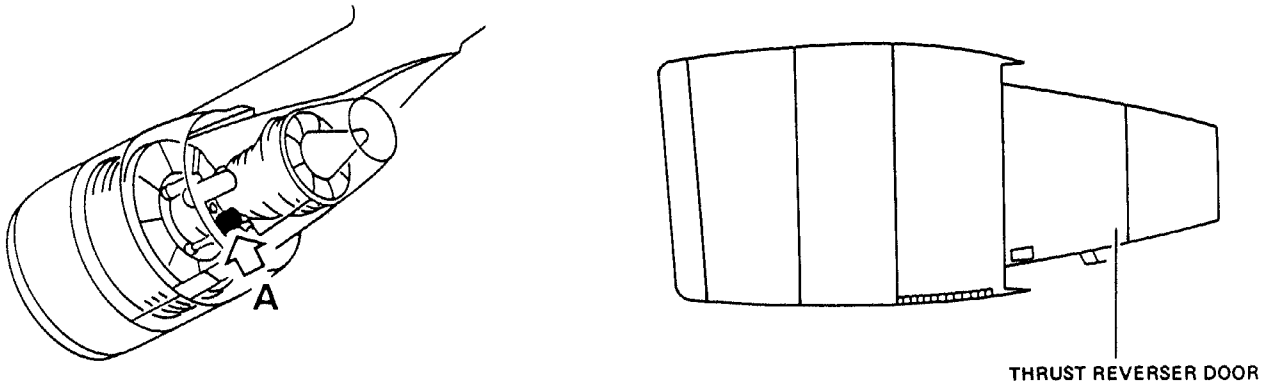
(Ref. Fig. 301)

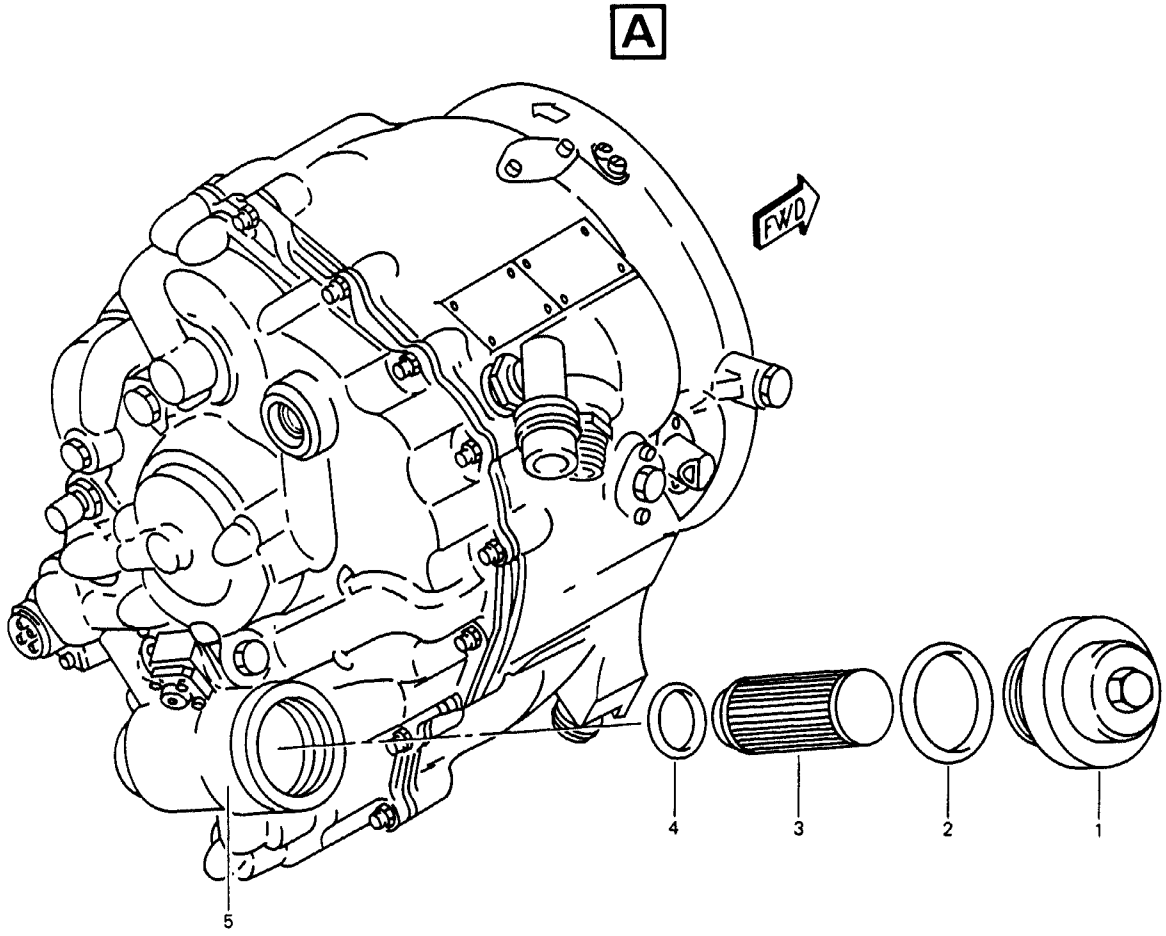
WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

(1)Depressurize IDG by connecting drain line to overflow drain valve or depressurize IDG by pressing the "PUSH TO VENT valve" (if still installed) for approximately 15 seconds.
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.
(2)Cut and remove lockwire from filter cover.
(3)Remove cover (1) from filter bowl (5).
(4)Remove filter element (3). Discard the two O-rings (2) and (4).

D. Check of the Oil Filter
(1)If you smell a fuel odour from the filter element or filter cover, do the servicing of the IDG after chemical contamination (Ref. 24-11-00, P. Block 301 para. 3.).
(2)If you think that the condition of the oil in the filter element or on the filter cover is not correct, do a sampling of the IDG (Ref. 12-32-24, P. Block 301).
(3)If the removed filter element is clogged, replace it with a new filter element.
(4)If bright metal deposits are present on the filter element, a deposit analysis is required :
(a)Bright metal particles, chips or flakes which can be clearly defined as chunks or pieces caused by breakage, remove IDG and return it to the overhaul facility.
(b)If non-magnetic bright metal particles are present in considerable quantity on the filter element or in drained oil, examine oil coolers to make certain that oil system is not contaminated. Remove IDG and return it to the overhaul facility.
(c)A moderate number of non-magnetic scattered small metallic flakes (bronze or silver-colored metal) or of flakes of generator insulation produced by normal wear are permitted.
(d)A considerable number of non-metallic items such as black epoxy chips, sleeving and other form of generator insulation should not necessitate removal of the IDG in the absence of metallic evidence. Examine oil coolers to make certain that oil system is not contaminated.
CAUTION : DO NOT CLEAN OR REPLACE FILTER IF THE IDG IS RETURNED TO THE OVERHAUL FACILITY.
(e)If the IDG is being removed for any cause or for a pressure differential indicator extended red button, remove the scavenge filter and check for damage, collapse, or indications that contaminated oil is bypassing the filter and entering the external circuit.
If the filter is damaged, collapsed, or shows signs of bypassing :
- remove and replace the external coolers,
- replace air/oil heat exchanger (Ref. 24-11-21, P. Block 401),
R - replace fuel/oil cooler (Ref. 79-21-05, P. Block 401).

E. Installation
CAUTION : DO NOT CLEAN AND USE AGAIN A FILTER ELEMENT THAT YOU REMOVED.





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IDG System Scavenge Filter
Figure 301

CAUTION : MAKE CERTAIN FILTER COMPONENTS ARE SEATED IN THE IDG SCAVENGE FILTER CAVITY BEFORE INSTALLING FILTER COVER. THE FILTER COMPONENTS MAY BE DAMAGED IF NOT PROPERLY INSTALLED. DO NOT FORCE FILTER COMPONENTS INTO HOUSING BY TIGHTENING FILTER COVER.

(1)Lubricate new O-ring (4) with Material No. 04-008 or oil and install it on replacement filter element (3).
(2)Install filter assembly into filter bowl (5).
(3)Install O-ring (2) in cover (1).
(4)Install cover (1) on filter bowl (5) and TORQUE to between 13 and 15 lbf.ft. (1.76 and 2.34 m.daN). Wirelock.
(5)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).
(6)Perform dry motoring test (Ref. 71-00-00, P. Block 501).

F. Close-Up
(1)Remove safety clips and tags and close circuit breakers 3XT and 4XT.
(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers for the appropriate engine.

3. Servicing of the IDG after Oil Chemical Contamination

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Circuit Breaker Safety Clips
(3)	Torque Wrench
(4)	Oil (Ref. 12-13-24)
(5)98A12001017000	Tank-Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(6)	Lockwire dia 0.032 in
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors
- 12-13-24, P. Block 1	Electrical Power
R - 79-21-05, P. Block 401	Fuel/oil cooler

B. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(3)Place container under IDG.

C. Procedure

NOTE : If the cause of the contamination is fuel leaks :

R - replace main fuel/oil cooler (Ref. 79-21-05, P. Block 401).

(Ref. Fig. 302)

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

(1) Drain IDG as per 12-13-24, P. Block 1.

NOTE : The color of the oil which flows from the case drain and the color of the oil put into the IDG must be the same, or collect 1 USgal (3.8 l) to 1.5 Usgal (5.7 l) of oil from the case drain.

(2) Allow oil from cooling system to drain into a suitable container by disconnecting oil-in and oil-out lines from fittings on IDG.

CAUTION : USE DOUBLE-WRENCH METHOD WHEN TORQUING OIL-IN AND OIL-OUT LINES. IF THE DOUBLE-WRENCH METHOD IS NOT FOLLOWED, EXCESS TORQUE MAY BE TRANSFERRED TO INTEGRATED DRIVE GENERATOR FITTINGS, RESULTING IN DAMAGE TO INTEGRATED DRIVE GENERATOR BOSSES.

(3) Connect oil-in line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(4) Connect oil-out line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(5) Replenish IDG as per 12-13-24, P. Block 1.

(6) Run engine until IDG oil temperature reaches 175°F (79.4°C) minimum (Ref. 71-00-00, P. Block 501).

(7) Drain IDG as per 12-13-24, P. Block 1.

NOTE : The color of the oil which flows from the case drain and the color of the oil put into the IDG must be the same, or collect 1 USgal (3.8 l) to 1.5 USgal (5.7 l) of oil from the case drain.

(8) Allow oil from cooling system to drain into a suitable container by disconnecting oil-in and oil-out lines from fittings on IDG.

(9) Replace scavenge filter as per para 2.

(10) Connect oil-in line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(11) Connect oil-out line and TORQUE coupling to between 900 and 1000 lbf. in. (10.17 and 11.30 m.daN) using double-wrench technique.

(12) Replenish IDG as per 12-13-24, P. Block 1.

D. Close-Up

(1) Remove safety clips and tags and close circuit breakers 3XT and 4XT.

(2) Close LH thrust reverser door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers for the appropriate engine.

4. IDG Oil - Type Change

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Container 1.5 Gal. (5.68l)
(2)	Circuit Breaker Safety Clips

ITEM	DESIGNATION
(3)	Torque Wrench
(4)	Oil (Ref. 12-13-24)
(5)98A12001017000	Tank - Engine Oil Filling Up (Portable Type)
or	
DH13PM	Tank-Engine Oil Filling Up (Portable Type)
(6)	Lockwire dia. 0.032 in.
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

B. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG 1	3XT	206/D20
22VU	DISC/IDG 2	4XT	206/D21

(2)Open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

C. Procedure

(Ref. Fig. 303)

(1)Drain IDG (Ref. 12-13-24, P. Block 1) and do not install case drain plug (3) again.

(2)Replace IDG scavenge filter as per Para. 2.

(3)Flushing of the IDG

NOTE : Approximately 3.8L (1 USgal) of oil flow into the container.

(a)Remove dust cap from pressure fill valve (1).

(b)Connect pressure fill hose (4) to pressure fill valve (1).

(c)Use a pump to fill IDG with filtered oil until :

- the color of the oil that flows from the case drain is the same as the color of the oil that you put inot the IDG or
- you collect 3.8L (1 USgal) of oil from the case drain.

(4)Installation of the case drain plug

(a)Lubricate new O-ring (2) with oil.

(b)Install new O-ring (2) on case drain plug (3).

(c)Install case drain plug (3).

(d)TORQUE case drain plug (3) to between 55 lbf.in. and 75 lbf.in. (0.56 m.daN and 0.85 m.daN).

WARNING : WEAR GOGGLES WHEN YOU INSTALL LOCKWIRE.

(e)Safety case drain plug (3) with lockwire.

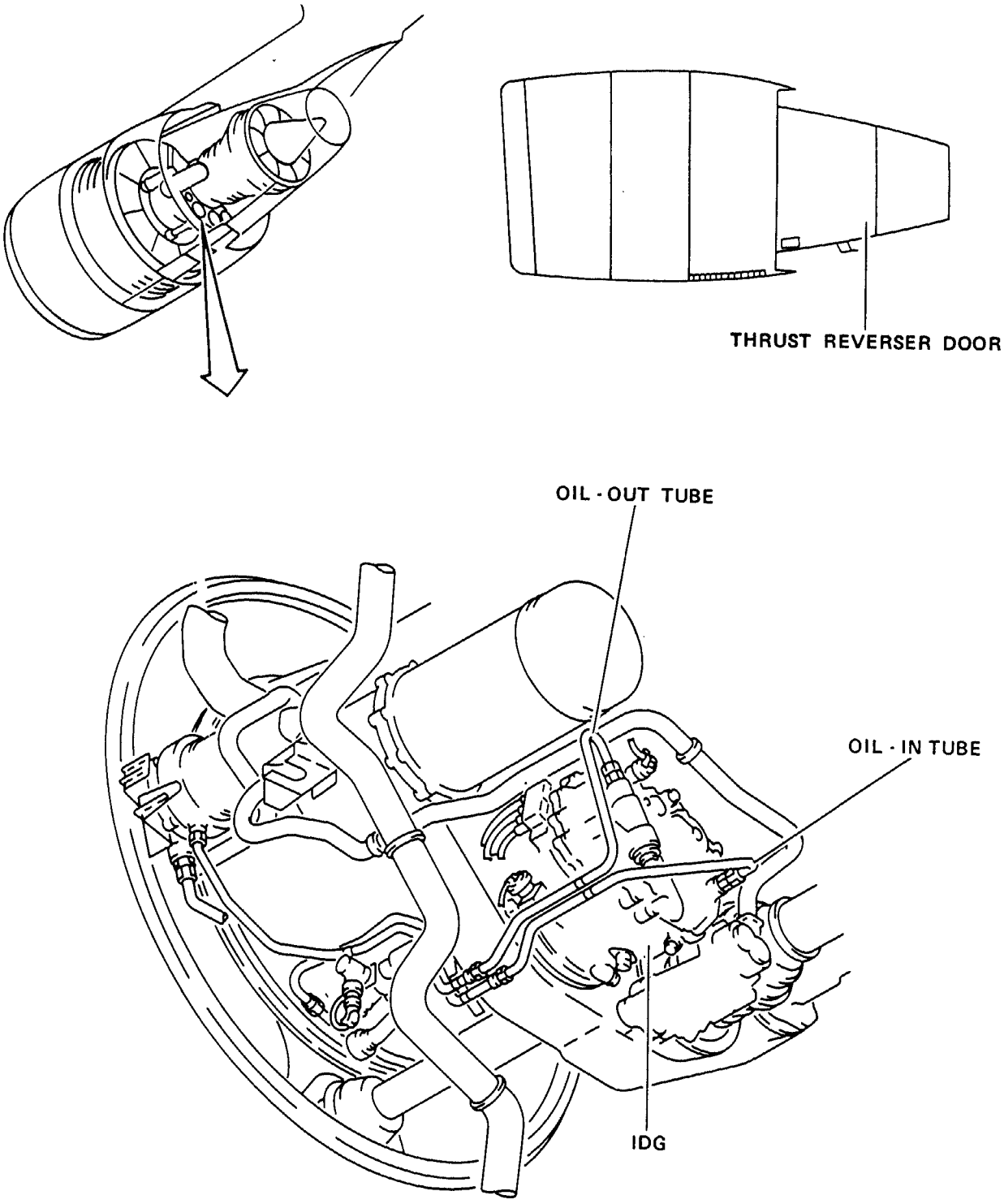
(5)Replesnish IDG with oil (Ref. 12-13-24, P. Block 1).

(6)Close access.

(a)Make sure that the work area is clean of tools and other items.

(b)Remove safety clips and tags and close circuit breakers 3XT and 4XT.

(c)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).



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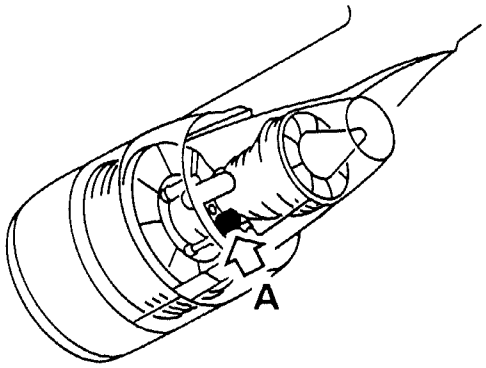
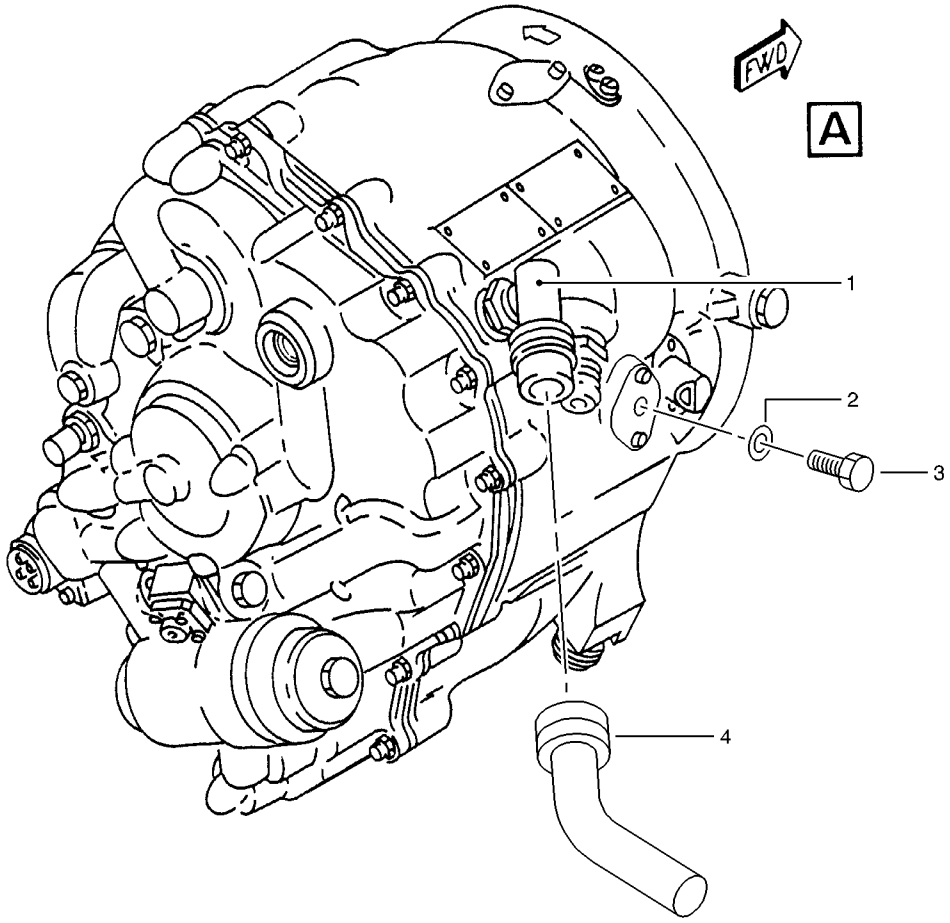
IDG System - Oil-In and Oil-Out Lines to the IDG
Figure 302





NOTE: IDG IS ROTATED TO SHOW BOTTOM VIEW

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R

IDG Oil-Type Change
Figure 303

(7)Do a dry motoring (Ref. 71-00-00, P. Block 501) and make sure that there are no leaks at the cover of the IDG scavenge filter.

NOTE : We recommended that you do a visual inspection to make sure that there are no leaks at the cover of the IDG scavenge filter. Do this inspection at the subsequent engine start, at minimum idle (Ref. 71-00-00, P. Block 501).
At this time, the oil pressure in the lubrication system and the cooling system of the IDG is higher and the oil circulation time is longer.

(8)Do an inspection of the oil level (Ref. 24-11-00, P. Block 601).

1. Operational Test

A. Check of IDG disconnect system-engine static
(1)Reason for the Job
To check IDG disconnect system and manual resetting.
(2)Equipment and Materials

ITEM		DESIGNATION
R	(a)	Snapwire (copper wire)
	(b)	Lead-seal
	(c)	Sealing Pliers
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 24-41-00, P. Block 501	AC External Power Control

(3)Procedure
(a)Job Set-Up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 Open IDG reset access door.
3 Make certain that the following circuit breakers are closed.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21

(b)IDG disconnect test (Ref. Fig. 501)
CAUTION : IF THE ENGINE IS RUNNING, DO NOT ACTUATE THE DISCONNECT SWITCH UNLESS THE ENGINE IS AT OR ABOVE IDLE SPEED. THE DISCONNECT MAY BE ACTUATED WITH THE ENGINE SHUT DOWN, BUT IT MUST BE RESET BEFORE THE ENGINE IS STARTED. DISCONNECTING THE IDG WITH THE ENGINE BELOW IDLE SPEED OR WITH THE ENGINE SHUT DOWN DOES NOT RESULT IN COMPLETE SEPARATION OF THE DISCONNECT DOG TEETH. STARTING THE ENGINE WITHOUT RESETTING THE DISCONNNECT OR DISCONNECTING THE IDG WITH THE ENGINE BELOW IDLE SPEED COULD RESULT IN DAMAGE TO THE DOG TEETH.
CAUTION : DO NOT ACTUATE DISCONNECT SWITCH FOR LONGER THAN 3 SECONDS. ALLOW A MINIMUM OF 60 SECONDS BETWEEN ACTUATION PERIODS.

ACTION	RESULT
1. On panel 424VU - open the safety guard and press PUSH TO DISC IDG1 or IDG2 push-button switch	On the IDG - perception of a "click" indicates a correct disconnect function.
2. On the IDG - slowly pull the disconnect reset	On the IDG - the "click" that can be felt at

ACTION	RESULT
ring to the outward limit of travel - allows the disconnect reset ring to return slowly to the maximum inward position without binding	the end of travel indicates that the disconnect mechanism is reset

(Ref. Fig. 501)

NOTE : At first engine run up, check correct position of the corresponding electrical generation.

NOTE : If the engine is started after the test, a GCU resetting must be performed by releasing, then pressing the corresponding GEN pushbutton switch.

(c)Close-up

1 On panel 424VU

- Close IDG pushbutton switch safety guard.

R - Install snapwire (copper wire) and lead-seal.

2 Close IDG reset access door.

3 In avionics compartment, on GPCU 7XG

- perform MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).

4 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test

A. Check of IDG Disconnect System - Engine Running

(1)Reason for the Job

To check IDG disconnect system and manual resetting.

(2)Equipment and Materials

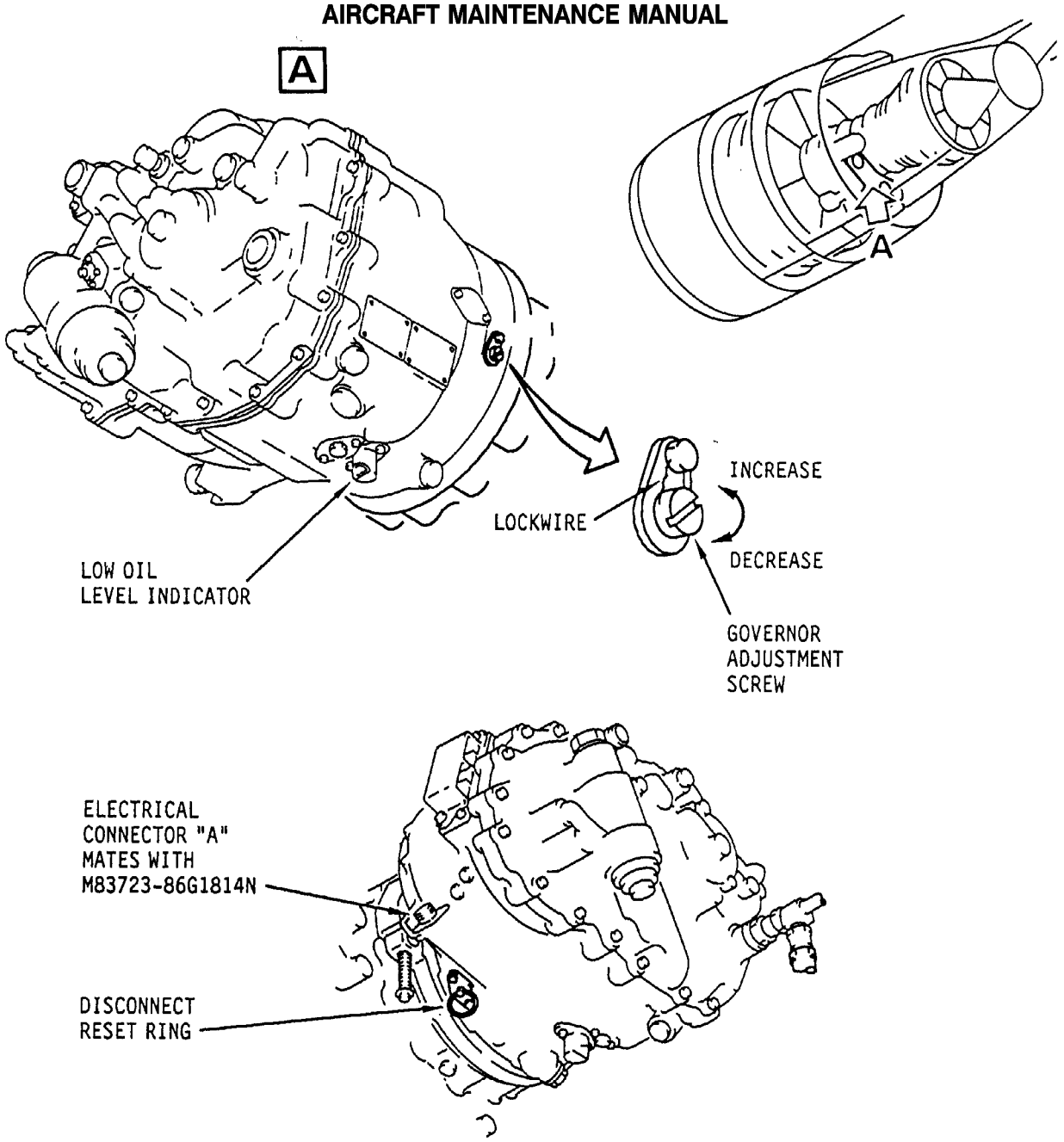
ITEM	DESIGNATION
R (a)	Snapwire (copper wire)
(b)	Lead-seal
(c)	Sealing Pliers
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General

(3)Procedure

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Make certain that the following circuit breakers are closed :



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IDG System - Adjustment/Test
Figure 501

R

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21

3 Make certain that circuit breakers associated to the ECAM system are closed and activate the R ECAM display unit.
4 Select ELEC AC page
5 Run up engines (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network
6 On panel 425VU, place AC parameter selector switch in GEN1 or 2 position according to the IDG to be checked

(b)IDG disconnect test

CAUTION : DO NOT PERFORM DISCONNECT TEST IF INTEGRATED DRIVE GENERATOR INPUT SPEED IS BELOW 4,500 REVOLUTIONS PER MINUTE. DISCONNECTION OF THE INTEGRATED DRIVE GENERATOR BELOW THE MINIMUM INPUT SPEED MAY DAMAGE THE JAW TEETH AND SEAL ON THE INTEGRATED DRIVE GENERATOR INPUT SHAFT.

CAUTION : DO NOT ACTUATE DISCONNECT SWITCH FOR LONGER THAN 3 SECONDS. ALLOW A MINIMUM OF 60 SECONDS BETWEEN ACTUATION PERIODS.

CAUTION : DO NOT RESET THE DISCONNECT IF THE ENGINE GEARBOX DRIVE SHAFT SPEED IS GREATER THAN 100 REVOLUTIONS PER MINUTE. RESETTING THE DISCONNECT WITH THE INPUT SPEED ABOVE THE 100 REVOLUTIONS PER MINUTE MAXIMUM WILL DAMAGE THE JAW TEETH AND SEAL ON THE INTEGRATED DRIVE GENERATOR INPUT SHAFT AND THE CARBON SEAL.

ACTION	RESULT
1. With engines at idle, on panel 424VU - open safety guard and press PUSH TO DISC IDG1 or IDG2 pushbutton switch	On panel 424VU, - FAULT legend of the corresponding GEN pushbutton switch comes on. On panel 425VU - no display on indicators On the R ECAM display unit - check correspondence with information on panels 424VU and 425VU
2. On GPCU - press FAULT ISOLATE pushbutton switch	On GPCU - DISC TRIP message appears.

(c)System resetting

1 Shut down engines (Ref. 71-00-00, P. Block 501)
2 Open IDG reset access door giving access to the IDG.
3 Reset IDG disconnect system :
a Slowly pull the disconnect reset ring to the outward limit of travel, noting the amount of hand force required. Allow the disconnect reset ring to return slowly to the maximum inward posi-

tion. Operation of the reset ring should be smooth with moderate force required and no indication of binding.

NOTE : The solenoid actuating pin will produce a "click" that can be felt in the disconnect reset ring as the disconnect reset ring approaches the outward travel limit.

b Slowly pull the disconnect reset ring to the outward travel limit, noting the amount of hand force required. The force required will be noticeably less than that required in paragraph a and there will be no indication of the solenoid actuating pin resetting.

NOTE : If the disconnect does not reset properly according to paragraph a reject the IDG.

4 Close IDG reset access door.

NOTE : At first engine run up, check correct position of the corresponding electrical generation.

NOTE : If the engine is started after the test, a CGU resetting must be performed by releasing, then pressing the corresponding GEN pushbutton switch.

(d)Close-up

1 De-activate the ECAM system

2 On panel 424VU

- Close IDG pushbutton switch safety guard.

R - Install snapwire (copper wire) and lead-seal.

3 In avionics compartment, on GPCU 7XG

- perform a MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).

4 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Frequency Adjustment

CAUTION : Frequency is normally set before delivery of the unit. Periodic frequency adjustment is not a normal maintenance action and should only be performed if a consistent shift of steady state frequency is observed. Other indications of extremely high or low frequency are usually indicative of IDG internal failure. If extremely high or low frequency is encountered, interrogate BITE to determine the cause.

CAUTION : Adjustment of the governor while the IDG is mounted on the engine accessory gearbox requires a ground run of the engine.

(1)Reason for the Job.

Adjust frequency to 400Hz ± 5Hz if it is out of limits.

(2)Equipment and Materials

ITEM	DESIGNATION
(a)	Lockwire dia.0.032in.
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

(3)Procedure

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Make certain that circuit breakers associated to the ECAM system are closed and activate the R ECAM display unit.

3 Select ELEC AC page

4 Run up engine 1 or 2 (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network.

5 On panel 425VU, place AC parameter selector switch in GEN1 or 2 position according to the IDG to be adjusted.

R (b)Adjustment (Ref. Fig. 501)

1 With engine running, note generator frequency value displayed on the ECAM and on the frequencymeter on panel 425VU in order to compute the adjustment to be performed.

2 Shut down engine (Ref.71-00-00, P. Block 501).

3 Open, safety and tag circuit breakers for the appropriate engine, and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

4 Cut and remove lockwire from governor adjustment screw.

5 Turn the adjustment screw clockwise to decrease the frequency and counterclockwise to increase the frequency. Adjust to bring the frequency to 400 ± 1 hertz.
NOTE : One turn of adjustment screw represents a change of 3.0 to 3.5 hertz.

6 Secure adjustment screw with lockwire, using care to avoid changing the adjustment screw setting.

7 Remove safety clips and tags and close circuit breakers. Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

8 Start the engine and check the frequency. If necessary, shut down the engine and repeat the adjustment procedure.

(c)Close-up

1 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

1. Operational Test

A. Check of IDG Disconnect System-Engine Static
(1)Reason for the job
To check IDG disconnect system and manual resetting.
(2)Equipment and materials

ITEM	DESIGNATION
R (a)	Snapwire (copper wire)
(b)	Lead-seal
(c)	Sealing Pliers
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control

(3)Procedure
(a)Job Set-up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 Open IDG reset access door.
3 Make certain that the following circuit breakers are closed.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21

(b)IDG disconnect test (Ref. Fig. 501)
CAUTION : IF THE ENGINE IS RUNNING, DO NOT ACTUATE THE DISCONNECT SWITCH UNLESS THE ENGINE IS AT OR ABOVE IDLE SPEED. THE DISCONNECT MAY BE ACTUATED WITH THE ENGINE SHUT DOWN, BUT IT MUST BE RESET BEFORE THE ENGINE IS STARTED. DISCONNECTING THE IDG WITH THE ENGINE BELOW IDLE SPEED OR WITH THE ENGINE SHUT DOWN DOES NOT RESULT IN COMPLETE SEPARATION OF THE DISCONNECT DOG TEETH. STARTING THE ENGINE WITHOUT RESETTING THE DISCONNNECT OR DISCONNECTING THE IDG WITH THE ENGINE BELOW IDLE SPEED COULD RESULT IN DAMAGE TO THE DOG TEETH.
CAUTION : DO NOT ACTUATE DISCONNECT SWITCH FOR LONGER THAN 3 SECONDS. ALLOW A MINIMUM OF 60 SECONDS BETWEEN ACTUATION PERIODS.

ACTION	RESULT
1. On panel 424VU - open the safety guard and press PUSH TO DISC IDG1 or IDG2 push-button switch	On the IDG - perception of a "click" indicates a correct disconnect function.
2. On the IDG - slowly pull the disconnect reset	On the IDG - the "click" that can be felt at

ACTION	RESULT
ring to the outward limit of travel - allows the disconnect reset ring to return slowly to the maximum inward position without binding	the end of travel indicates that the disconnect mechanism is reset

(Ref. Fig. 501)

NOTE : At first engine run up, check correct position of the corresponding electrical generation.

NOTE : If the engine is started after the test, a GCU resetting must be performed by releasing, then pressing the corresponding GEN pushbutton switch.

(c)Close-up

1 On panel 424VU

- Close IDG pushbutton switch safety guard

R - Install snapwire (copper wire) and lead-seal.

2 Close IDG reset access door.

3 In avionics compartment, on GPCU 7XG

- perform MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).

4 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test

A. Check of IDG Disconnect System - Engine Running

(1)Reason for the Job

To check IDG disconnect system and manual resetting.

(2)Equipment and Materials

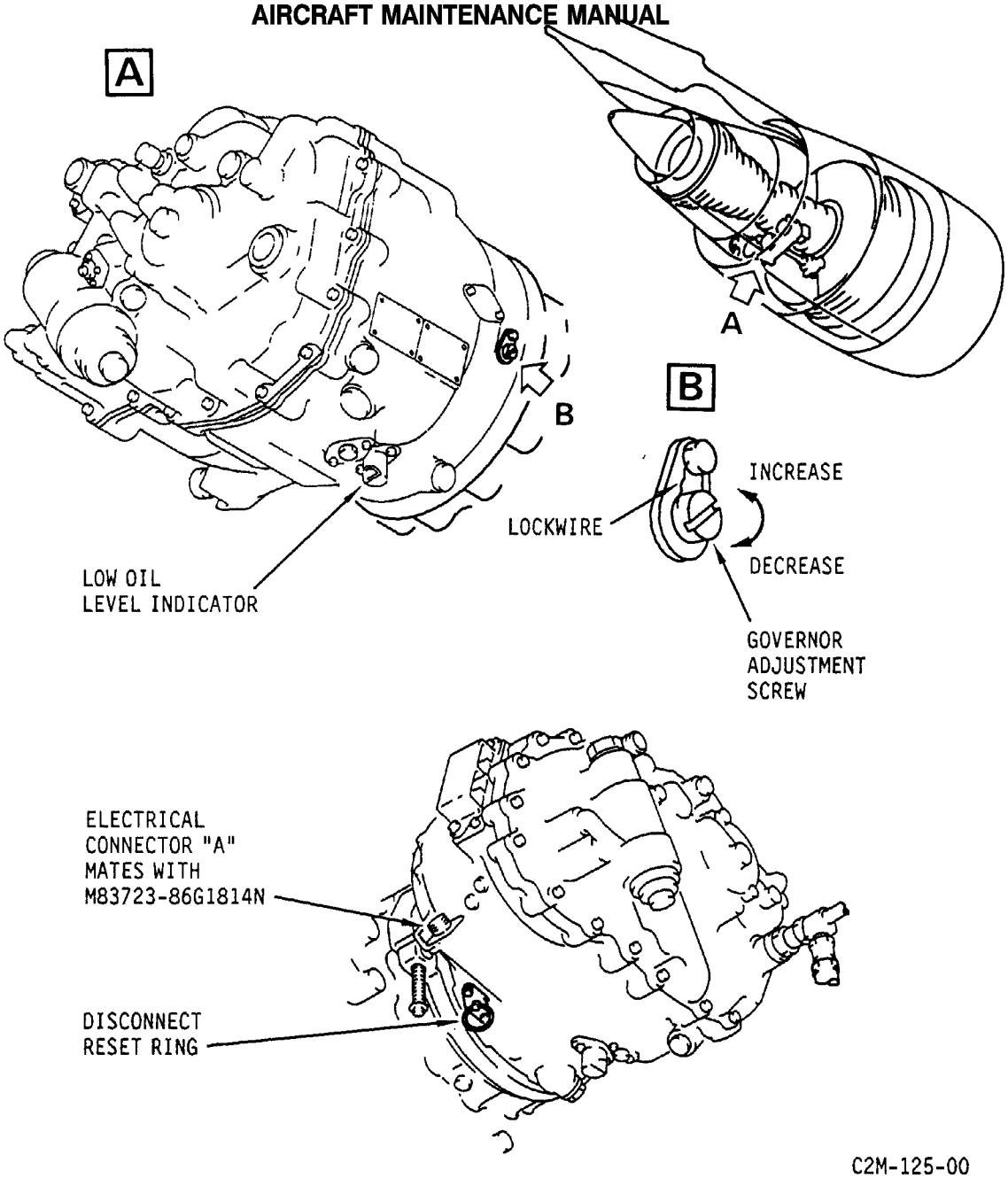
ITEM	DESIGNATION
R (a)	Snapwire (copper wire)
(b)	Lead-seal
(c)	Sealing Pliers
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General

(3)Procedure

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Make certain that the following circuit breakers are closed :



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IDG System - Adjustment/Test
Figure 501

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21

3 Make certain that circuit breakers associated to the ECAM system are closed and activate the R ECAM display unit.
4 Select ELEC AC page
5 Run up engines (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network
6 On panel 425VU, place AC parameter selector switch in GEN1 or 2 position according to the IDG to be checked

(b)IDG disconnect test

CAUTION : DO NOT PERFORM DISCONNECT TEST IF INTEGRATED DRIVE GENERATOR INPUT SPEED IS BELOW 4,500 REVOLUTIONS PER MINUTE. DISCONNECTION OF THE INTEGRATED DRIVE GENERATOR BELOW THE MINIMUM INPUT SPEED MAY DAMAGE THE JAW TEETH AND SEAL ON THE INTEGRATED DRIVE GENERATOR INPUT SHAFT.

CAUTION : DO NOT ACTUATE DISCONNECT SWITCH FOR LONGER THAN 3 SECONDS. ALLOW A MINIMUM OF 60 SECONDS BETWEEN ACTUATION PERIODS.

CAUTION : DO NOT RESET THE DISCONNECT IF THE ENGINE GEARBOX DRIVE SHAFT SPEED IS GREATER THAN 100 REVOLUTIONS PER MINUTE. RESETTING THE DISCONNECT WITH THE INPUT SPEED ABOVE THE 100 REVOLUTIONS PER MINUTE MAXIMUM WILL DAMAGE THE JAW TEETH AND SEAL ON THE INTEGRATED DRIVE GENERATOR INPUT SHAFT AND THE CARBON SEAL.

ACTION	RESULT
1. With engines at idle, on panel 424VU - open safety guard and press PUSH TO DISC IDG1 or IDG2 pushbutton switch	On panel 424VU, - FAULT legend of the corresponding GEN pushbutton switch comes on. On panel 425VU - no display on indicators On the R ECAM display unit - check correspondence with information on panels 424VU and 425VU
2. On GPCU - press FAULT ISOLATE pushbutton switch	On GPCU - DISC TRIP message appears.

(c)System resetting

1 Shut down engines (Ref. 71-00-00, P. Block 501)
2 Open IDG reset access door giving access to the IDG.
3 Reset IDG disconnect system :
a Slowly pull the disconnect reset ring to the outward limit of travel, noting the amount of hand force required. Allow the disconnect reset ring to return slowly to the maximum inward posi-

tion. Operation of the reset ring should be smooth with moderate force required and no indication of binding.

NOTE : The solenoid actuating pin will produce a "click" that can be felt in the disconnect reset ring as the disconnect reset ring approaches the outward travel limit.

b Slowly pull the disconnect reset ring to the outward travel limit, noting the amount of hand force required. The force required will be noticeably less than that required in paragraph a and there will be no indication of the solenoid actuating pin resetting.

NOTE : If the disconnect does not reset properly according to paragraph a reject the IDG.

4 Close IDG reset access door.

NOTE : At first engine run up, check correct position of the corresponding electrical generation.

NOTE : If the engine is started after the test, a CGU resetting must be performed by releasing, then pressing the corresponding GEN pushbutton switch.

(d)Close-up

1 De-activate the ECAM system

2 On panel 424VU

- Close IDG pushbutton switch safety guard.

R - Install snapwire (copper wire) and lead-seal.

3 In avionics compartment, on GPCU 7XG

- perform a MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).

4 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Frequency Adjustment

CAUTION : Frequency is normally set before delivery of the unit. Periodic frequency adjustment is not a normal maintenance action and should only be performed if a consistent shift of steady state frequency is observed. Other indications of extremely high or low frequency are usually indicative of IDG internal failure. If extremely high or low frequency is encountered, interrogate BITE to determine the cause.

CAUTION : Adjustment of the governor while the IDG is mounted on the engine accessory gearbox requires a ground run of the engine.

(1)Reason for the Job.

Adjust frequency to 400Hz ± 5Hz if it is out of limits.

(2)Equipment and Materials

ITEM	DESIGNATION
(a)	Lockwire dia.0.032in.
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General
- 71-13-00, P. Block 301	Cowl Doors

(3)Procedure

(a)Job set-up
1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
2 Make certain that circuit breakers associated to the ECAM system are closed and activate the R ECAM display unit.
3 Select ELEC AC page
4 Run up engine 1 or 2 (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network.
5 On panel 425VU, place AC parameter selector switch in GEN1 or 2 position according to the IDG to be adjusted.

(b)Adjustment (Ref. Fig. 501)
1 With engine running, note generator frequency value displayed on the ECAM and on the frequencymeter on panel 425VU in order to compute the adjustment to be performed.
2 Shut down engine (Ref.71-00-00, P. Block 501).
3 Open, safety and tag circuit breakers for the appropriate engine, and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.
4 Cut and remove lockwire from governor adjustment screw.
5 Turn the adjustment screw clockwise to decrease the frequency and counterclockwise to increase the frequency. Adjust to bring the frequency to 400 ± 1 hertz.
NOTE : One turn of adjustment screw represents a change of 3.0 to 3.5 hertz.
6 Secure adjustment screw with lockwire, using care to avoid changing the adjustment screw setting.
7 Remove safety clips and tags and close circuit breakers. Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
8 Start the engine and check the frequency. If necessary, shut down the engine and repeat the adjustment procedure.

(c)Close-up
1 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

IDG SYSTEM - INSPECTION/CHECK

1. Reason for the Job

To make certain that the IDG operates correctly, by performing the following checks :

NOTE : Make sure that the IDG does not operate for more than 50 hours in the disconnected mode.
If the IDG operates for 50 hours in the disconnected mode, it will be necessary to :
- replace the IDG
- send the removed IDG for a shop inspection. There is a risk of damage to the ball bearing assembly on the input shaft.

A. Oil Level and Condition Check

B. Check for Leakage

C. Pressure Differential Indicator Check

D. Electrical Circuit Check

E. IDG Attachment Check

F. IDG Fuel/Oil Cooler Pressure Relief Valve Check

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- TSM 24-11-00, P. Block 101	IDG Power System
- 12-13-24, P. Block 1	Electrical Power
- 12-32-24, P. Block 301	Sampling of the IDG Oil for Analysis
- 24-11-00, P. Block 301	IDG System
- 24-11-11, P. Block 401	IDG System
- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
- 24-11-25, P. Block 401	Main Fuel/Oil Heat Exchanger
- 24-11-27, P. Block 401	Oil Cooling Tubing (IDG)
- 71-13-00, P. Block 301	Cowl Doors
- 71-70-00, P. Block 201	Engine Vents and Drains (Pylon Drain Clearing)

3. Procedure

A. Job Set-Up

(1)Open safety and tag the following circuit breakers :

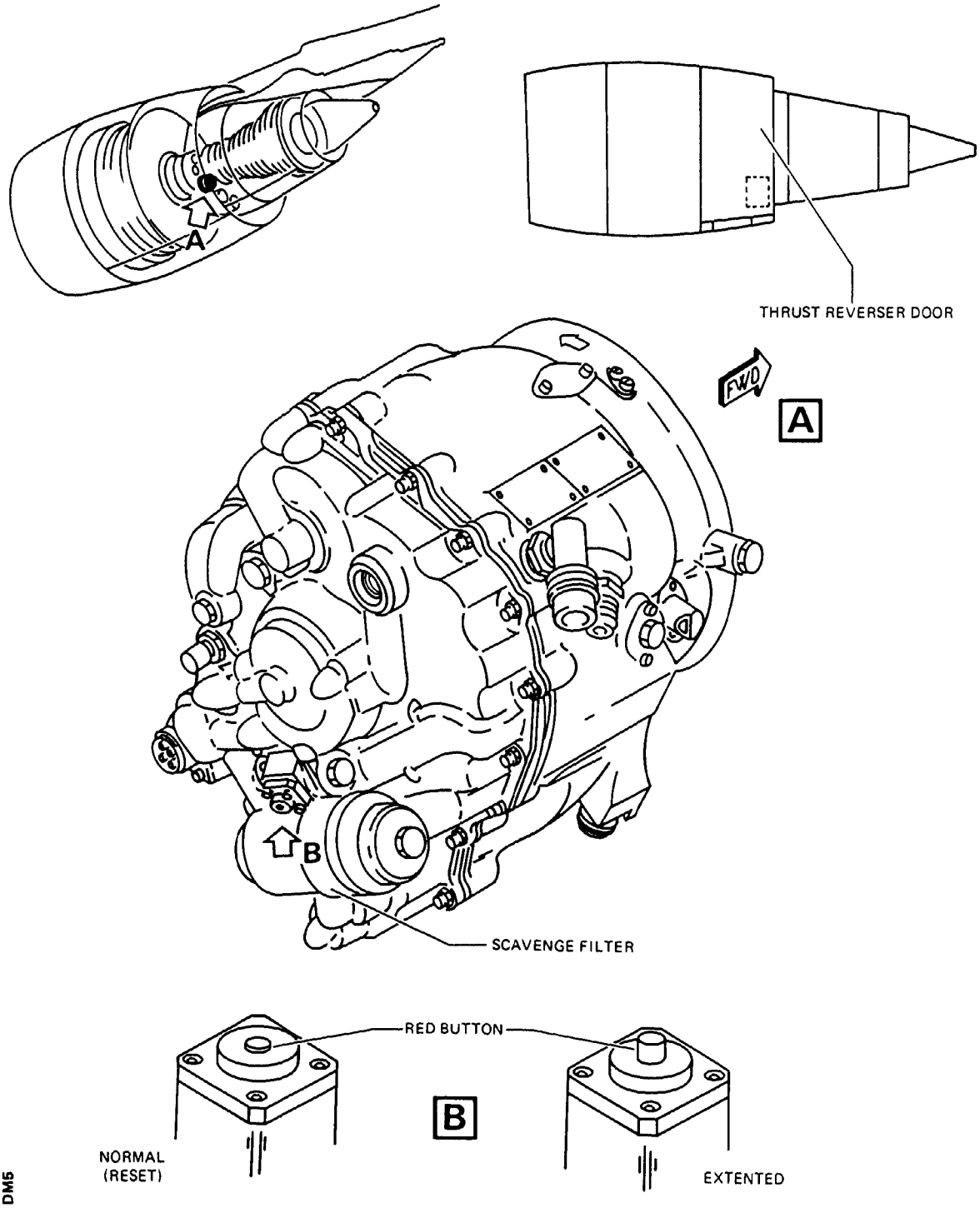
PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG1	3XT	206/D20
22VU	DISC/IDG2	4XT	206/D21

(2)Open safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

B. Oil Level and Condition Check
(Ref. Fig. 601)
(Ref. Fig. 602)
(Ref. Fig. 603)

R NOTE : An internal oil consumption of 1 cc is permitted for each flight
R hour or when the engines operate.

(1)Check the pressure differential indicator (Refer to Para. D).
(2)Using a flashlight, check the low oil level indicator viewing face for contamination that may obscure proper viewing of the IDG oil level. If contamination is present, clean the viewing face.
(3)After a minimum of 5 minutes stabilization time following engine shut-down, check the low oil level indicator. Position eyes so the white marks on the indicator align and observe the indicator :
- Config. 1 :
(a)If there is a silver spot (large or small) in the viewing area, oil servicing is required. Service the IDG (Ref. 12-13-24, P. Block 1).
(b)If there is no silver spot in the viewing area, oil servicing is not required.
- Config. 2 :
(a)If the two letters "OK" appear in the indicator, oil servicing is not required.
(b)If the two letters "OK" do not appear in the indicator, the oil quantity in the IDG is insufficient and oil servicing is required (Ref. 12-13-24, P. Block 1).
(4)If you smell a fuel odour from the filter element or filter cover, do the servicing of the IDG after oil chemical contamination (Ref. 24-11-00, P. Block 301).
(5)If you think that the condition of the oil in the filter element or on the filter cover is not correct, do a sampling of the IDG oil for analysis (Ref. 12-32-24, P. Block 301).
(6)Check oil for signs of discoloration or contamination (if the IDG has been operated at excessive temperature, there may be metal deposits).
(7)If any abnormal condition is observed :
(a)Check oil filter (Ref. 24-11-00, P. Block 301).
If the filter element shows bright metal deposits which can be clearly defined as chunks or pieces caused by breakage (in contrast to non-magnetic flakes or slivers caused by normal wear) or if the bright metal deposits are present in considerable quantity on the filter element, in the filter cavity, or in the oil drained from it, remove IDG and return it to the overhaul facility.
NOTE : A moderate number of scattered small metallic flakes (bronze- or silver-colored metal), or flakes of generator insulation are normal products of wear during operation. Even a considera-ble number of nonmetallic items such as black epoxy chips, sleeving, and other forms of generator insulation should not



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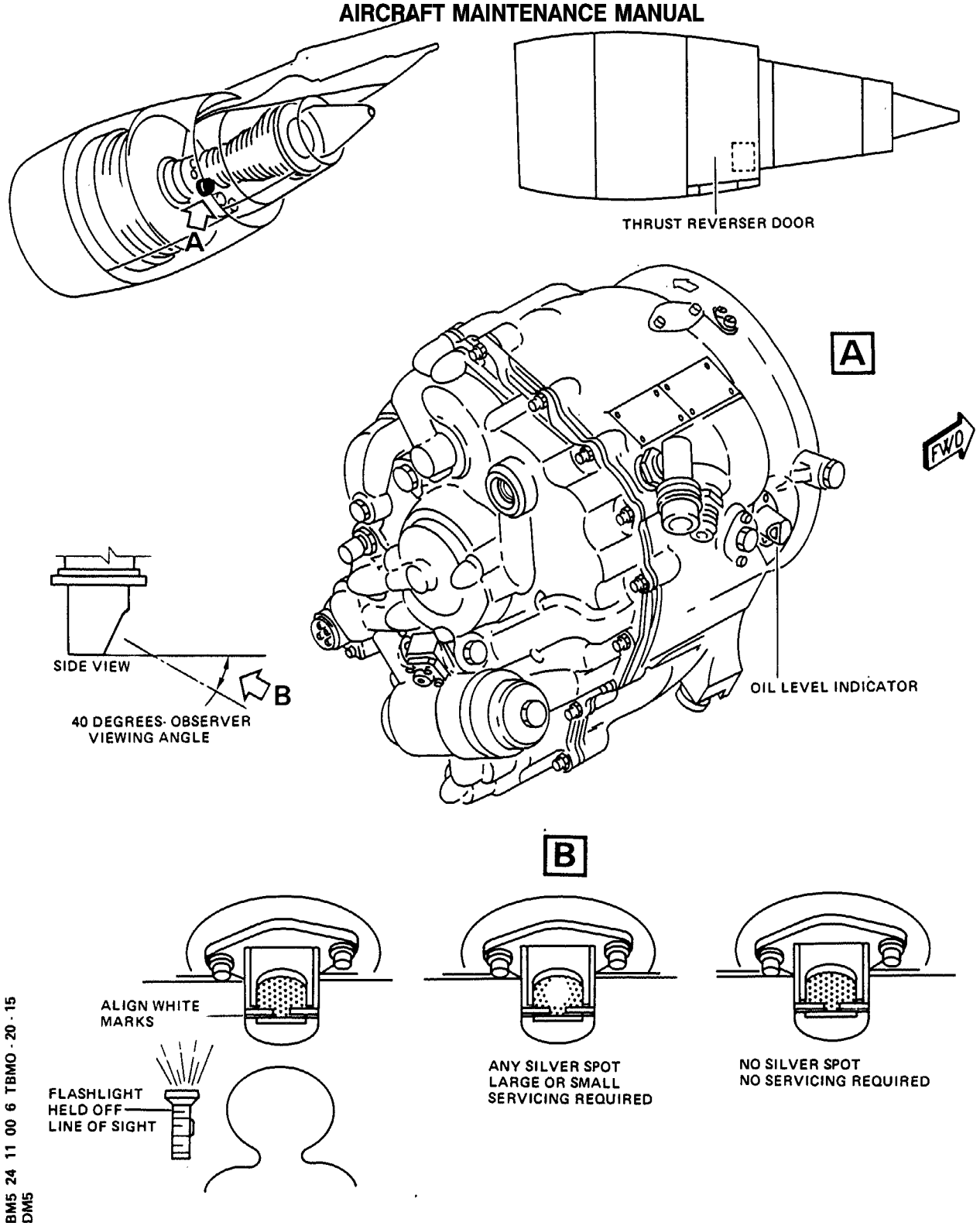
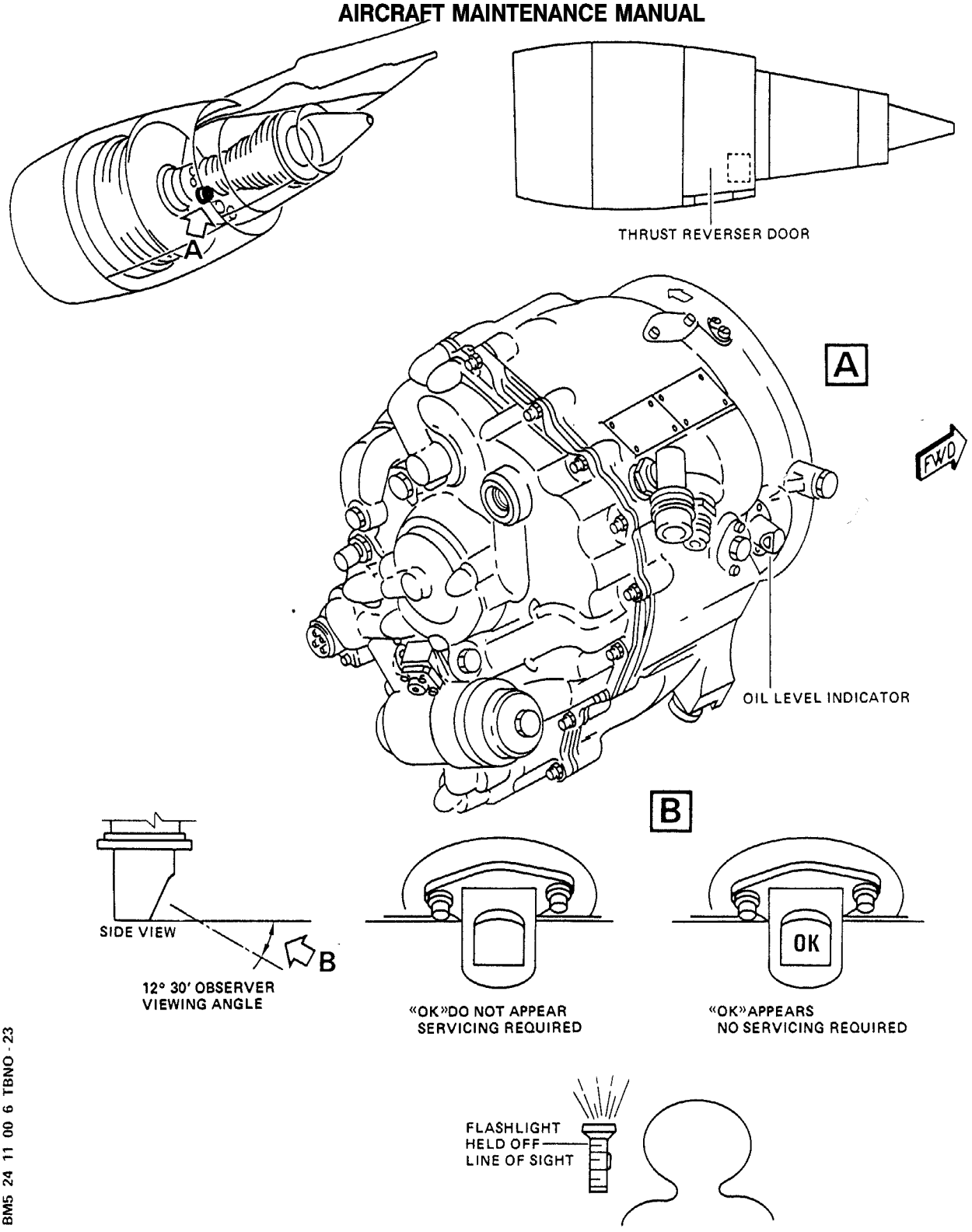
IDG System - Inspection
Figure 601



IDG System - IDG Oil Indicator (Config. 1)
Figure 602



IDG System - IDG Oil Indicator (Config. 2)
Figure 603

necessitate removal of the integrated drive generator (IDG) in the absence of metallic evidence.

(b)If the filter element or/and the O-rings is(are) damaged : remove the tubings, the cooler and the IDG and return them to the overhaul facility.

1 Remove main fuel/oil heat exchanger (Ref. 24-11-25, P. Block 401).

2 Remove auxiliary fuel/oil heat exchanger (Ref. 24-11-26, P. Block 401).

3 Remove the IDG (Ref. 24-11-11, P. Block 401).

(c)If the filter element is clogged, replace it with a new filter element.

(d)Change oil (Ref. 24-11-00, P. Block 301) or replenish the tank (Ref. 12-13-24, P. Block 1).

C. Check for Leaks

(1)Check the IDG oil system (IDG housing, IDG minor components, external lines and coolers) for leakage.

(2)If an oil leakage is observed (Ref. 71-70-00, P. Block 201), change the seals on the accessory concerned, and top up oil tank if necessary.

D. Pressure Differential Indicator/Check

(1)The DPI (Differential Pressure Indicator) indicates when the IDG scavenge filter is blocked, usually due to IDG wear particles clogging the filter.

(2)If the filter element does not show signs of metal particles, do the steps that follow :

(a)If the Differential Pressure Indicator (DPI) is not extended : Install the filter element (Ref. 24-11-00, P. Block 301).

(b)If the DPI is extended : Do the alternate procedure (Ref. TSM 24-11-00, P. Block 101).

E. Electrical Circuit Check

(1)Check the condition of the electrical harness, and make certain electrical connectors are correctly connected and wirelocked.

F. IDG Attachment Check

(1)Remove lockwire from tension bolt and check torque value on tension bolt (Ref. Fig. 604) (detail C).
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(2)If the torque on QAD adapter tension bolt is less than 15 lbf. ft. (2.1 m.daN), tap exposed periphery of QAD ring with a brass drift to center the ring and prevent false torque readings and TORQUE to between 20 and 22 lbf. ft. (2.75 and 3m.daN).

(3)Repeat tap and torque check until torque value does not drop below 15 lbf.ft. (2.1 m.daN).

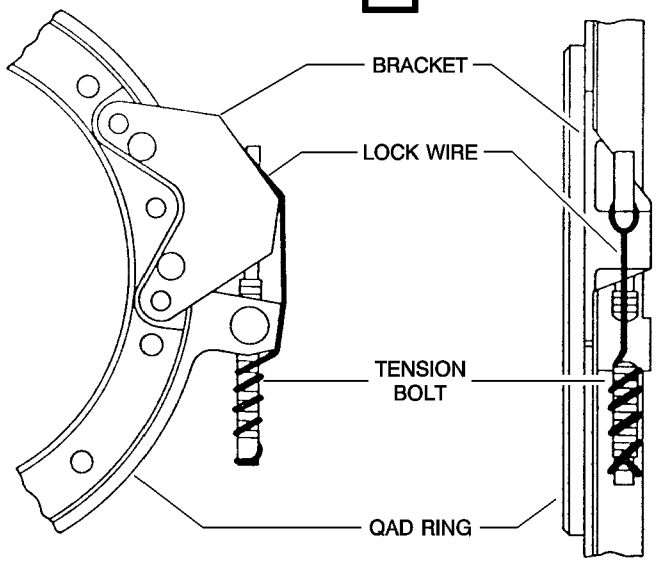
(4)Finally torque QAD adapter tension bolt to between 20 and 22 lbf. ft. (2.75 and 3 m.daN).

(5)Check the distance between ring lug and bracket of QAD ring. If the distance is less than 9/16 in. (14.28 mm) minimum (Ref. Fig. 604) (detail B), remove and replace QAD adapter (Ref. 24-11-11, P. Block 401).

(6)Check QAD adapter by shaking anti-drive end of IDG. If the IDG is loose, remove and replace QAD adapter (Ref. 24-11-11, P. Block 401).

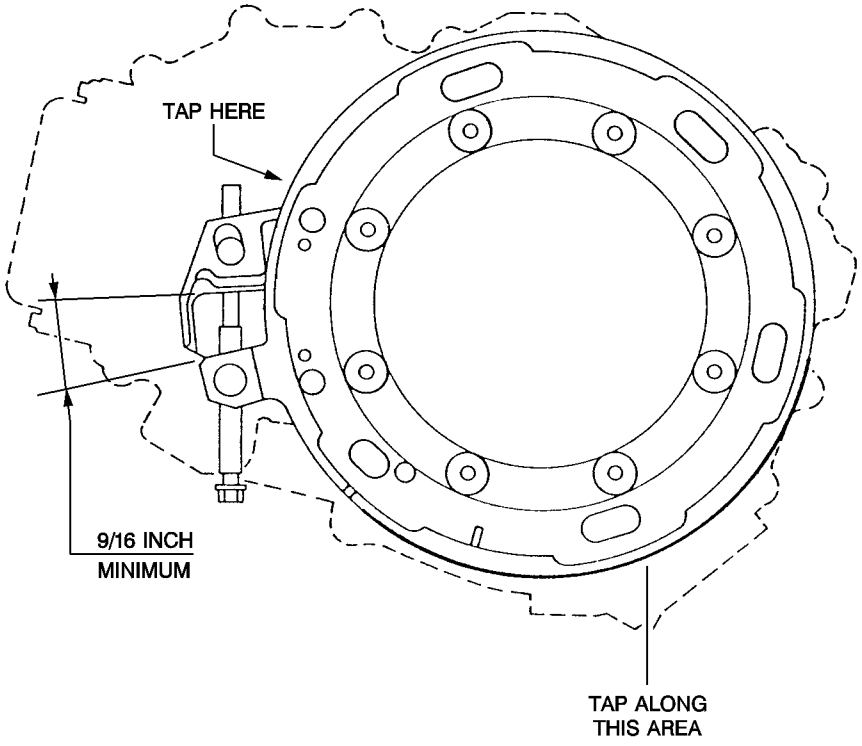
(7)Secure tension bolt with lockwire (Ref. Fig. 604) (detail A)

A



SECURING THE TENSION BOLT WITH LOCKWIRE

B



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IDG System - QAD Adapter
Figure 604

G. IDG Fuel/Oil Cooler Pressure Relief Valve (PRV) Check
(1)Inspect valve to determine if pop-out indicator is extended.
(2)If pop-out indicator is extended, check IDG oil level and condition. (Ref. Para. 1.C.).
(a)If fuel contamination is present, replace fuel/oil cooler (Ref. 24-11-25, P. Block 401).
1 Reset pressure relief valve pop-out indicator.
2 Flush system (Ref. 12-13-24, P. Block 1) and service IDG (Ref. 24-11-00, P. Block 301).
(b)If fuel contamination is not present, indicated by low oil level, replace relief pressure valve (Ref. 24-11-27, P. Block 401). Service IDG (Ref. 24-11-00, P. Block 301).

4. Close-Up

A. Remove safety clips and tags and close circuit breakers 3XT and 4XT.

B. Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

IDG SYSTEM - INSPECTION/CHECK

1. Reason for the Job

To make certain that the IDG operates correctly, by performing the following checks :

NOTE : Make sure that the IDG does not operate for more than 50 hours in the disconnected mode.
If the IDG operates for 50 hours in the disconnected mode, it will be necessary to :
- replace the IDG
- send the removed IDG for a shop inspection. There is a risk of damage to the ball bearing assembly on the input shaft.

A. Oil Level and Condition Check

B. Check for Leakage

C. Pressure Differential Indicator/Check

D. Electrical Circuit Check

E. IDG Attachment Check

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- TSM 24-11-00, P. Block 101	IDG Power System
- 12-13-24, P. Block 1	Electrical Power
- 12-32-24, P. Block 301	Sampling of the IDG Oil for Analysis
- 24-11-00, P. Block 301	IDG System
- 24-11-11, P. Block 401	IDG System
- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
R - 79-21-05, P. Block 401	Fuel/Oil Cooler
- 71-13-00, P. Block 301	Cowl Doors
- 71-70-00, P. Block 201	Engine Vents and Drains (Pylon Drain Clearing)

3. Procedure

A. Job Set-Up

(1)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	DISC/IDG1	3XT	206/D20
22VU	DISC/IDG2	4XT	206/D21

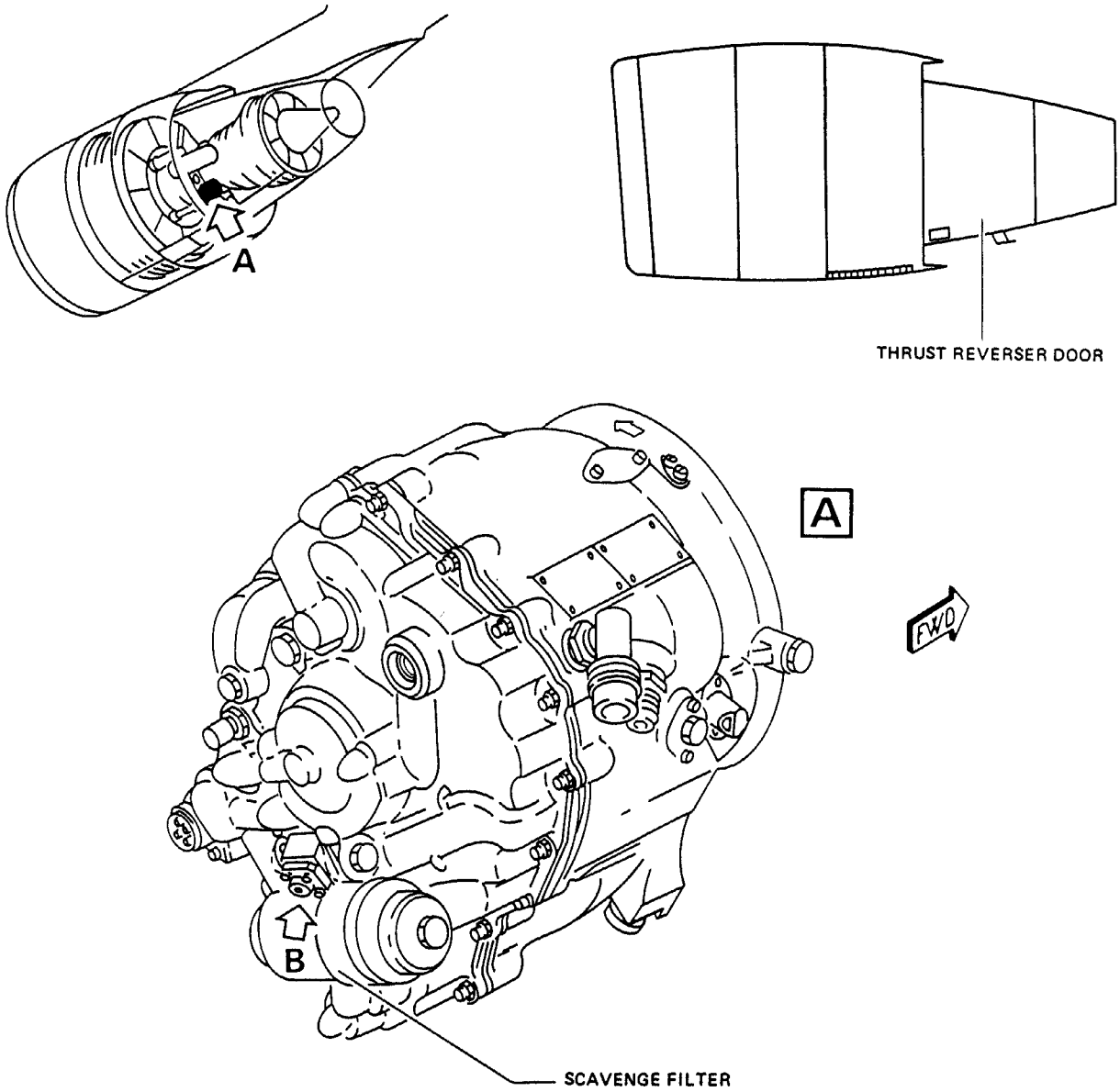
(2)Open safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

B. Oil Level and Condition Check
(Ref. Fig. 601)
(Ref. Fig. 602)
(Ref. Fig. 603)

R NOTE : An internal oil consumption of 1 cc is permitted for each flight
R hour or when the engines operate.

(1)Check the pressure differential indicator (Refer to Para. D).
(2)Using a flashlight and a mirror, check the low oil level indicator viewing face for contamination that may obscure proper viewing of the IDG oil level. If contamination is present, clean the viewing face.
(3)After a minimum of 5 minutes stabilization time following engine shutdown, check the low oil level indicator. Position eyes in front of the indicator and observe it :
- Config. 1 (if applicable) :
(a)If there is a silver spot (large or small) in the viewing area, oil servicing is required. Service the IDG (Ref. 12-13-24, P. Block 1).
(b)If there is no silver spot in the viewing area, oil servicing is not required.
- Config. 2 (if applicable) :
(a)If the two letters "OK" appear in the indicator, oil servicing is not required.
(b)If the two letters "OK" do not appear in the indicator, the oil quantity in the IDG is insufficient and oil servicing is required (Ref. 12-13-24, P. Block 1).
(4)If you smell a fuel odour from the filter element or filter cover, do the servicing of the IDG after oil chemical contamination (Ref. 24-11-00, P. Block 301).
(5)If you think that the condition of the oil in the filter element or on the filter cover is not correct, do a sampling of the IDG oil for analysis (Ref. 12-32-24, P. Block 301).
(6)Check oil for signs of discoloration or contamination (if the IDG has been operated at excessive temperature, there may be metal deposits).
(7)If any abnormal condition is observed :
(a)Check oil filter (Ref. 24-11-00, P. Block 301).
If the filter element shows bright metal deposits which can be clearly defined as chunks or pieces caused by breakage (in contrast to non-magnetic flakes or slivers caused by normal wear) or if the bright metal deposits are present in considerable quantity on the filter element, in the filter cavity, or in the oil drained from it, remove IDG and return it to the overhaul facility.
NOTE : A moderate number of scattered small metallic flakes (bronze- or silver-colored metal), or flakes of generator insulation are normal products of wear during operation. Even a considerable number of nonmetallic items such as black epoxy chips, sleeving, and other forms of generator insulation should not necessitate removal of the integrated drive generator (IDG) in the absence of metallic evidence.



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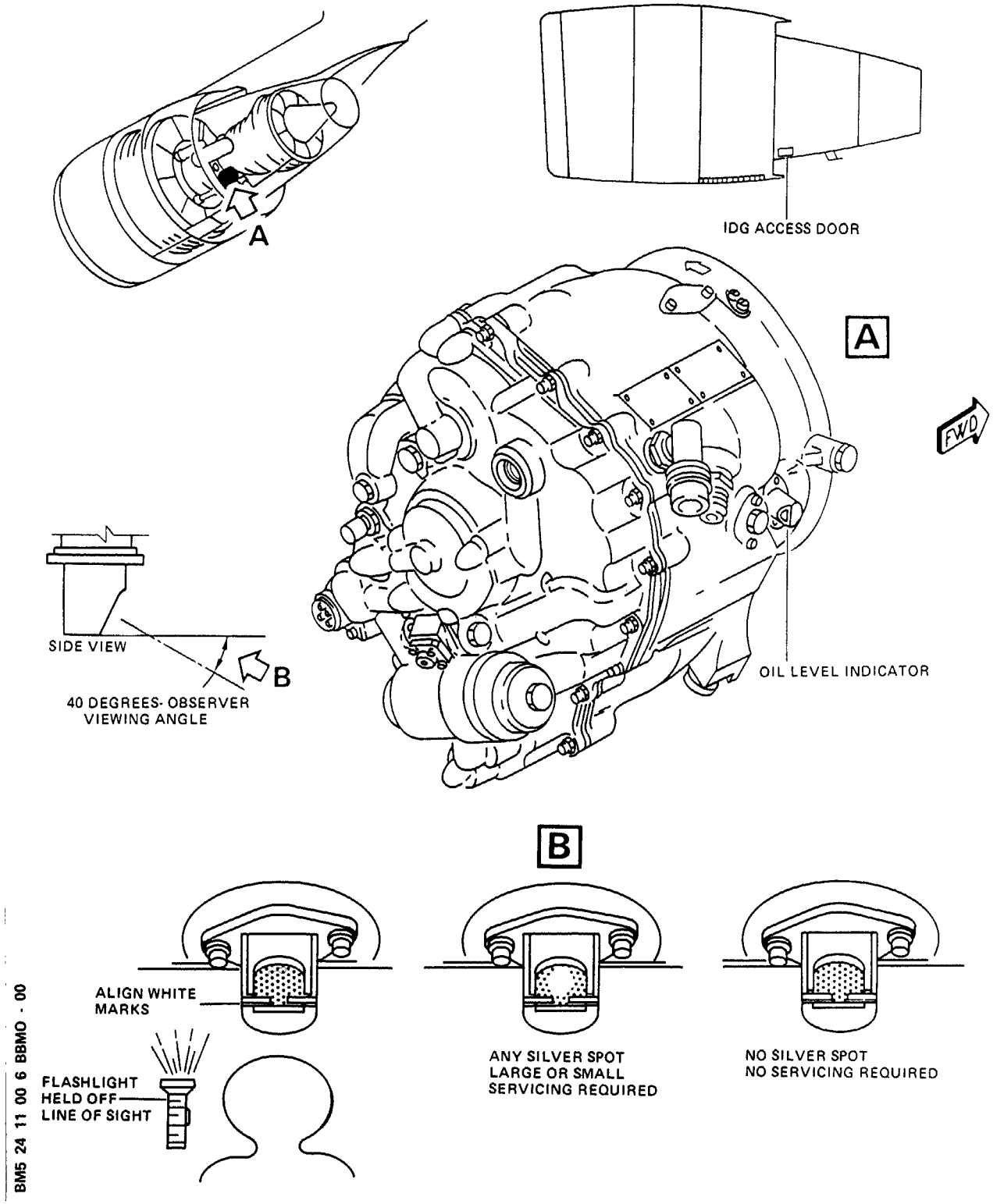
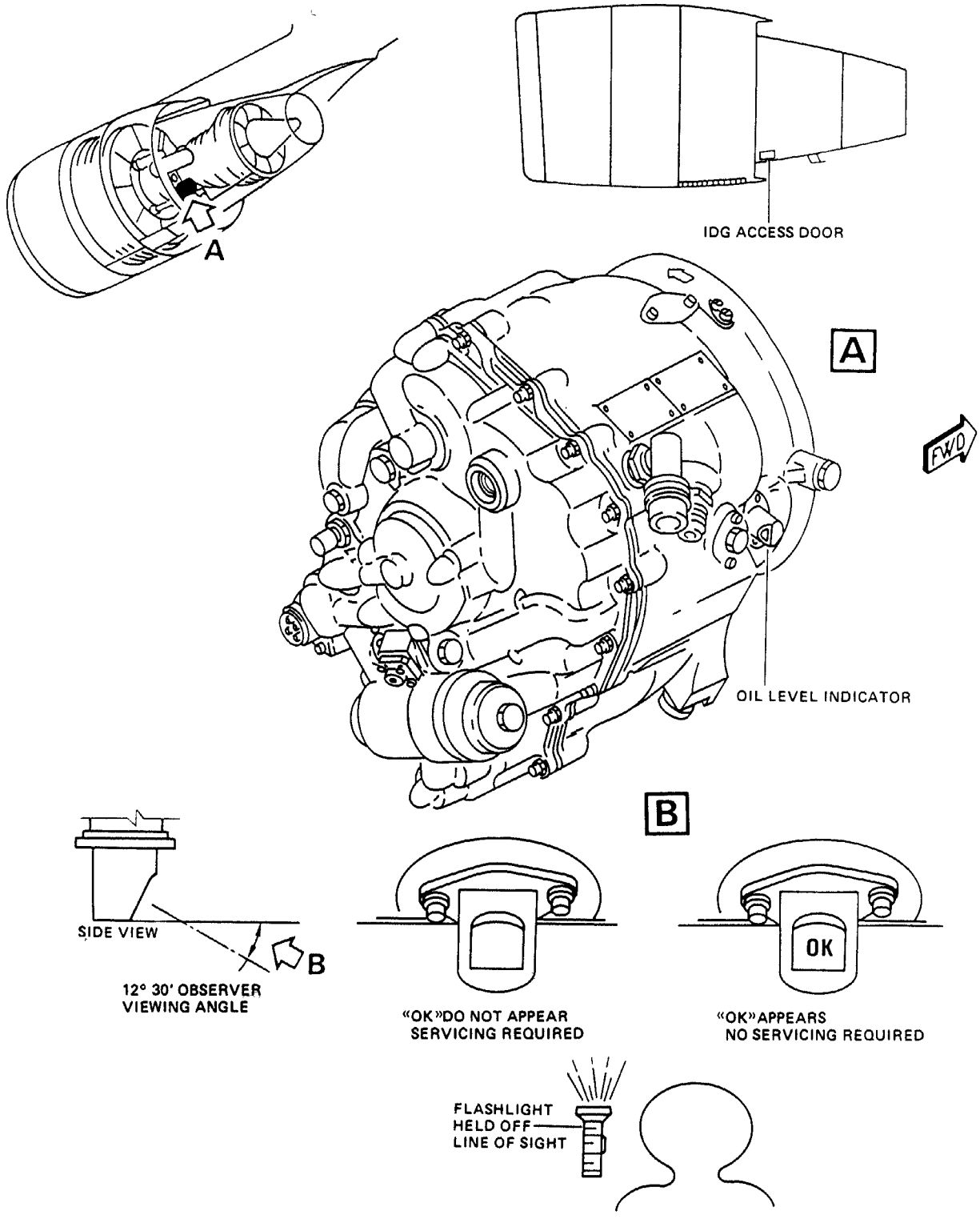
IDG System - Inspection
Figure 601

R



IDG System - IDG Oil Indicator (Config. 1)
Figure 602

R



IDG System - IDG Oil Indicator (Config. 2)
Figure 603

R

(b)If the filter element or/and the O-rings is(are) damaged : remove the tubings, the cooler and the IDG and return them to the overhaul facility.
1 Remove the Fuel/oil cooler (Ref. 79-21-05, P. Block 401).
2 Remove the IDG (Ref. 24-11-11, P. Block 401).
(c)If the filter element is clogged, replace it with a new filter element.
(d)Change oil (Ref. 24-11-00, P. Block 301) or replenish the tank (Ref. 12-13-24, P. Block 1).

C. Check for Leaks
(1)Check the IDG oil system (IDG housing, IDG minor components, external lines and coolers) for leakage.
(2)If an oil leakage is observed (Ref. 71-70-00, P. Block 201), change the seals on the accessory concerned, and top up oil tank if necessary.

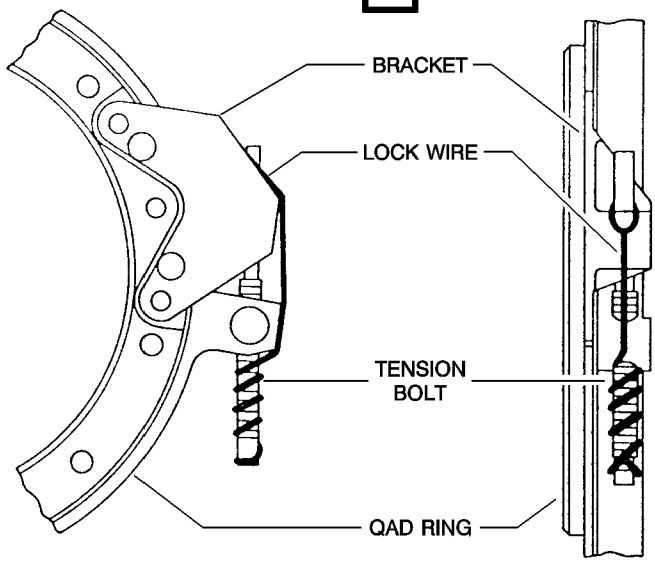
D. Pressure Differential Indicator/Check
(1)The DPI (Differential Pressure Indicator) indicates when the IDG scavenge filter is blocked, usually due to IDG wear particles clogging the filter.
(2)If the filter element does not show signs of metal particles, do the steps that follow :
(a)If the Differential Pressure Indicator (DPI) is not extended : Install the filter element (Ref. 24-11-00, P. Block 301).
(b)If the DPI is extended :
Do the alternate procedure (Ref. TSM 24-11-00, P. Block 101).

E. Electrical Circuit Check
(1)Check the condition of the electrical harness, and make certain electrical connectors are correctly connected and wirelocked.

F. IDG Attachment Check
(1)Remove lockwire from tension bolt and check torque value on tension bolt (Ref. Fig. 604) (detail C).
WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.
(2)If the torque on QAD adapter tension bolt is less than 15 lbf. ft. (2.1 m.daN), tap exposed periphery of QAD ring with a brass drift to center the ring and prevent false torque readings and TORQUE to between 20 and 22 lbf. ft. (2.75 and 3m.daN).
(3)Repeat tap and torque check until torque value does not drop below 15 lbf.ft. (2.1 m.daN).
(4)Finally torque QAD adapter tension bolt to between 20 and 22 lbf. ft. (2.75 and 3 m.daN).
(5)Check the distance between ring lug and bracket of QAD ring. If the distance is less than 9/16 in. (14.28 mm) minimum (Ref. Fig. 604) (detail B), remove and replace QAD adapter (Ref. 24-11-11, P. Block 401).
(6)Check QAD adapter by shaking anti-drive end of IDG. If the IDG is loose, remove and replace QAD adapter (Ref. 24-11-11, P. Block 401).
(7)Secure tension bolt with lockwire (Ref. Fig. 604) (detail A)

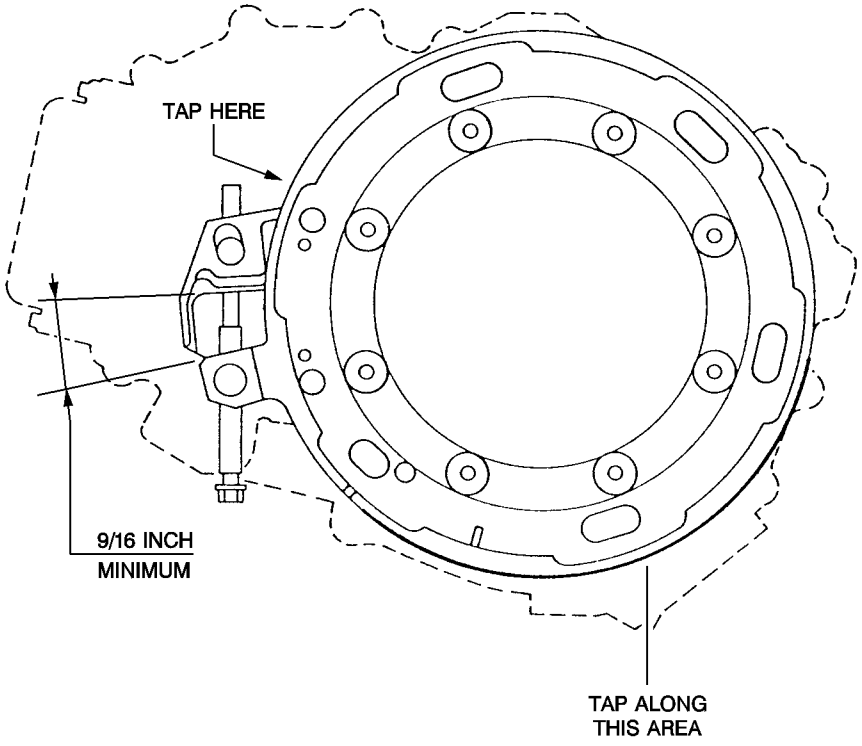
4. Close-Up

A



SECURING THE TENSION BOLT WITH LOCKWIRE

B



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IDG System - QAD Adapter
Figure 604

R

A. Remove safety clips and tags and close circuit breakers 3XT and 4XT.

B. Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
Remove safety clips and tags and close circuit breakers.

WARNING : BE CAREFUL WHEN YOU WORK ON THE ENGINE COMPONENTS IMMEDIATELY AFTER THE ENGINE IS SHUT DOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

1. Equipment and Materials

ITEM	DESIGNATION
A. Material No.C04-002	Solvent (Ref. 70-00-00)
B. Material No.C04-035	Alcohol, Isopropyl (Ref. 70-00-00)
Referenced Procedures	
- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
- 24-11-25, P. Block 401	IDG Fuel/Oil Heat Exchanger
- 24-11-27, P. Block 401	Oil Cooling Tubing (IDG)

R

2. Procedure

A. Job Set-Up
(1)Remove the IDG air/oil heat exchanger (Ref. 24-11-21, P. Block 401).
(2)Remove the IDG fuel/oil heat exchanger (Ref. 24-11-25, P. Block 401).
(3)Remove the oil cooling tubing (Ref. 24-11-27, P. Block 401).

B. Procedure
(1)Return the IDG air/oil heat exchanger to the overhaul facility for
R cleaning.
(2)Return the IDG fuel/oil heat exchanger to the overhaul facility for
R cleaning.
(3)Flush the oil cooling tubing with Material No.C04-002 or C04-035 to remove any contamination in the bores of the tubes.
CAUTION : MAKE CERTAIN THAT NO PART OF SWAB OR LINT-FREE CLOTH IS LEFT IN THE BORE OF THE TUBES. THE RESULTING RESTRICTION COULD CAUSE SERIOUS DAMAGE TO THE IDG.
(4)Pull a clean swab or lint-free cloth through the bore of the tubes. Repeat this step until swab or cloth shows no evidence of any remaining contamination.
(5)Dry the bores of the tubes with clean, dry air.

C. Close-up
(1)Install the IDG air/oil heat exchanger (Ref. 24-11-21, P. Block 401).
(2)Install the IDG fuel/oil heat exchanger (Ref. 24-11-25, P. Block 401).
(3)Install the oil cooling tubing (Ref. 24-11-27, P. Block 401).

IDG OIL SYSTEM - CLEANING

WARNING : BE CAREFUL WHEN YOU WORK ON THE ENGINE COMPONENTS IMMEDIATELY AFTER THE ENGINE IS SHUT DOWN. THE ENGINE COMPONENTS CAN STAY HOT FOR UP TO ONE HOUR.

1. Equipment and Materials

	ITEM	DESIGNATION
R	A. Material No.P11-027	Cleaning Agents (Ref. 70-00-00)
	Referenced Procedures	
	- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
	- 24-11-27, P. Block 401	Oil Cooling Tubing (IDG)
	- 79-21-05, P. Block 401	Fuel/Oil Cooler

2. Procedure

A. Job Set-Up
(1)Remove the IDG air/oil heat exchanger (Ref. 24-11-21, P. Block 401).
(2)Remove the fuel/oil cooler (Ref. 79-21-05, P. Block 401).
(3)Remove the oil cooling tubing (Ref. 24-11-27, P. Block 401).

B. Procedure
(1)Return the IDG air/oil heat exchanger to the overhaul facility for
R cleaning.
R (2)Return the fuel/oil cooler to the overhaul facility for cleaning.
R (3)Flush the oil cooling tubing with Material No.P11-027 to remove any contamination in the bores of the tubes.
(4)Dry the bores of the tubes with clean, dry air.

C. Close-up
(1)Install the IDG air/oil heat exchanger (Ref. 24-11-21, P. Block 401).
(2)Install the fuel/oil cooler (Ref. 79-21-05, P. Block 401).
(3)Install the oil cooling tubing (Ref. 24-11-27, P. Block 401).

WARNING : APPROVED HANDLING METHODS MUST BE USED DURING REMOVAL/INSTALLATION PROCEDURES TO PREVENT POSSIBLE INJURY TO PERSONNEL OR DAMAGE TO COMPONENT.

CAUTION : USE EXTREME CARE DURING REMOVAL/INSTALLATION PROCEDURES NOT TO KINK OR DENT FIRE SENSING ELEMENT CABLES INSTALLED ON ENGINES. PHYSICAL CONTACT CAN CAUSE HIDDEN DAMAGE.

CAUTION : USE DOUBLE-WRENCH METHOD WHEN TORQUING DURING INSTALLATION OR REMOVAL OF OIL LINES. IF THE DOUBLE-WRENCH METHOD IS NOT FOLLOWED, EXCESS TORQUE MAY BE TRANSFERRED TO INTEGRATED DRIVE GENERATOR FITTINGS, RESULTING IN DAMAGE TO INTEGRATED DRIVE GENERATOR BOSSES CAUSING EXTERNAL OIL LEAKS.

NOTE : If the IDG is being removed for any cause or for a pressure differential indicator extended red button, remove the scavenge filter and check for damage, collapse, or indications that contaminated oil is bypassing the filter and entering the external circuit. If the filter is damaged, collapsed, or contains indications of bypassing, remove and replace the external coolers and clean the external lines.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container - 2 US Gallons (7.57 l)
B. HYDROSG54	Device, 1/R IDG
C.	Packings
D.	Corrosion-Resistant Steel Lockwire
E.	Circuit Breaker Safety Clips
F.	Torque Wrenches
G. Material No. 03-002	Oils (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Doors
- 24-11-00, P. Block 501	IDG System

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFR1/CSNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, safety and tag circuit breakers for the appropriate engine and open L fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE OR SKIN CONTACT, SEEK MEDICAL ATTENTION.

(3)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal (Ref. Fig. 401, 402)

(1)Remove screws, washers, and terminal block cover.

NOTE : Make certain all phase leads are identified (N, T1,T2,T3).

(2)Remove captive nut/washer or nut and washer and disconnect phase leads.

(3)Install terminal captive nut/washer or nuts and washers finger-tight.

(4)Install and secure terminal block cover with washer and screws.

(5)Cut and remove lockwire and disconnect electrical plugs DG13A, and DG13B from IDG electrical receptable and install protective caps on IDG.

(6)Drain IDG oil (Ref. 12-13-24, P. Block 1).

(7)Cut and remove lockwire from jamnut.

(8)Remove dust cover from overflow drain coupling and pressure fill elbow coupling.

CAUTION : USE DOUBLE-WRENCH METHOD WHEN TORQUING OIL-IN AND OIL-OUT LINES. IF THE DOUBLE-WRENCH METHOD IS NOT FOLLOWED, EXCESS TORQUE MAY BE TRANSFERRED TO INTEGRATED DRIVE GENERATOR FITTINGS, RESULTING IN DAMAGE TO INTEGRATED DRIVE GENERATOR BOSSES.

(9)Remove overflow drain coupling, pressure fill elbow coupling, packings and drilled jamnut from IDG.

(10)Install overflow drain plug and pressure fill plug on IDG.

(11)Remove oil-in and oil-out lines from IDG. Install protective covers on line open ends.

(12)Remove unions and packings from IDG. Install covers on IDG and discard packings.

CAUTION : DO NOT APPLY MORE LIFT THAN NECESSARY TO SUPPORT INTEGRATED DRIVE GENERATOR. EXCESSIVE LIFT OR FAILURE TO SUPPORT INTGRATED DRIVE GENERATOR PROPERLY CAN DAMAGE INPUT SEAL.

(13)Move cradle hoist mechanism into position under mounted IDG. Raise cradle to touch IDG and then attach to the IDG. Raise cradle to take up some of the weight of the IDG.

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

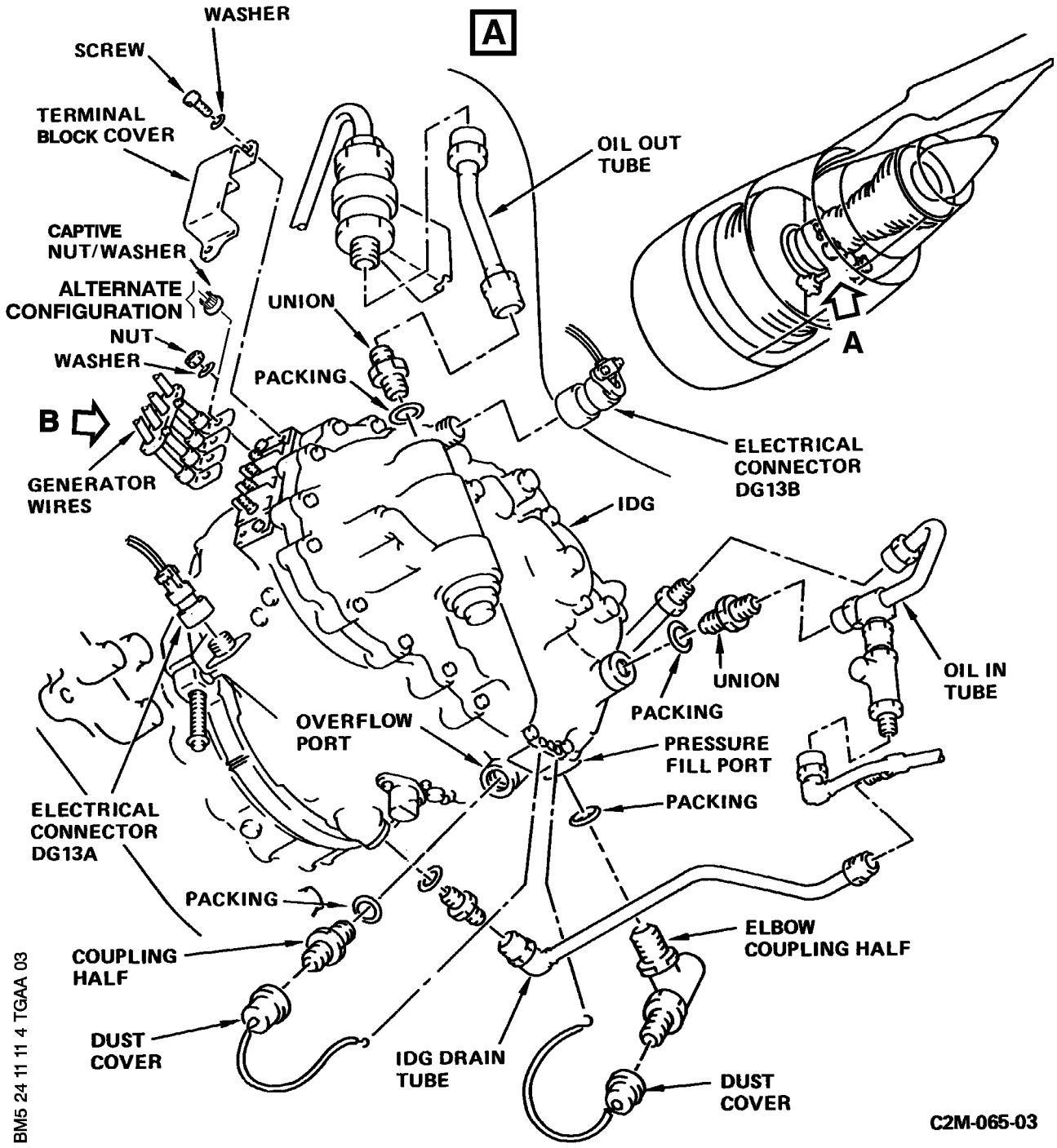
(14)Cut and remove lockwire from QAD tension bolt and unscrew tension bolt only part way to loosen IDG

(15)Adjust cradle to fully support weight of IDG and relieve any weight on QAD and IDG input shaft.

(16)Unscrew QAD tension bolt until stripe marks on QAD ring and IDG housing align. QAD adapter is in open position and clamping lugs will be disengaged when stripe marks are aligned.

CAUTION : GUIDE INTEGRATED DRIVE GENERATOR OUT IN A STRAIGHT LINE TO PREVENT BINDING OF INPUT SHAFT AND DAMAGING INTEGRATED DRIVE GENERATOR INPUT SEAL.

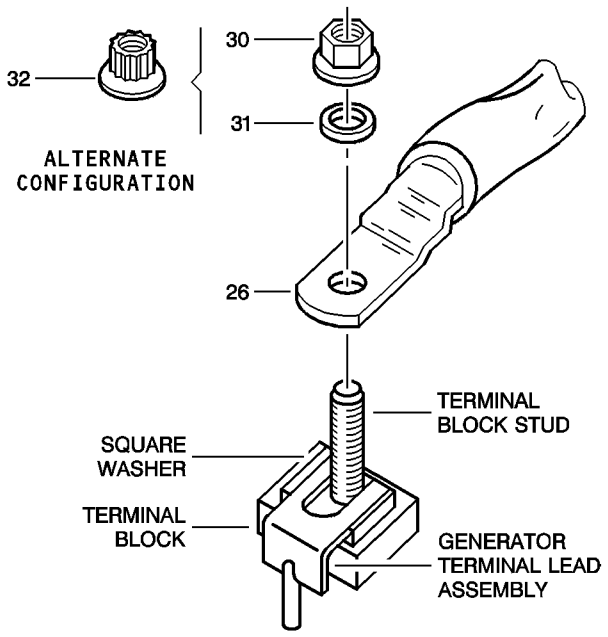
(17)Pull straight back on cradle and raise or lower as required to disengage



Integrated Drive Generator (Sheet 1/2)
Figure 401

B

PHASE LEAD INSTALLATION



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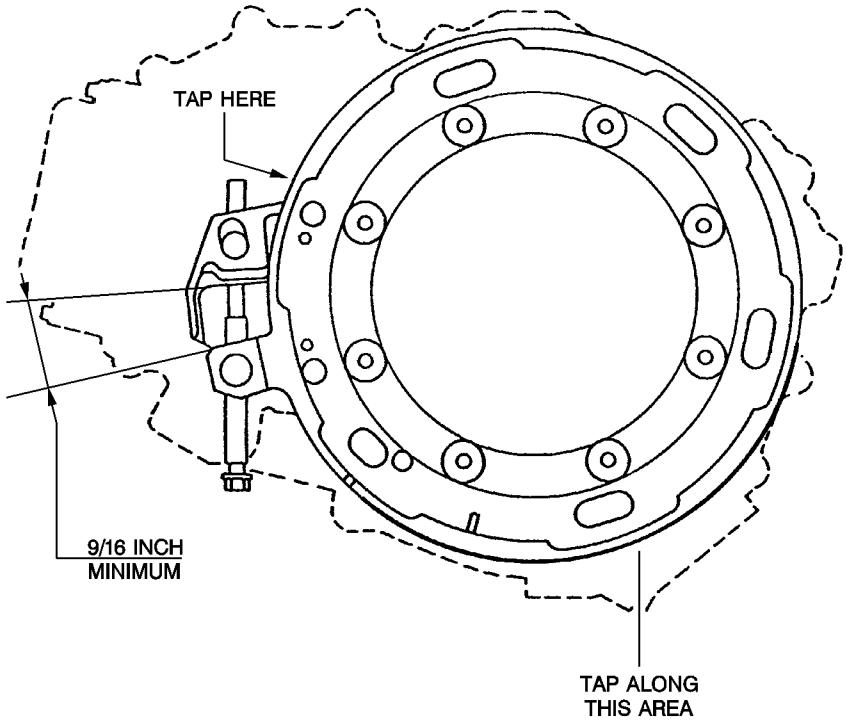
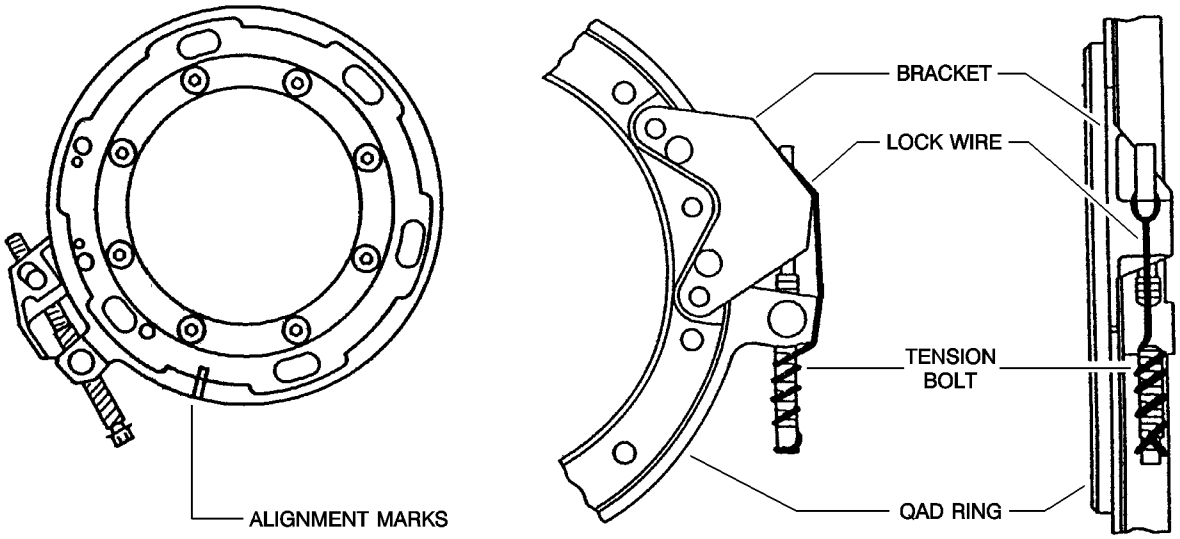
IDG. Phase Lead Installation (Sheet 2/2)
Figure 401





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IDG and Adapter Alignment Marks
Figure 402

IDG from QAD clamping lugs, and spline shaft from engine gearbox. Do not use external parts to pull or lift IDG.

(18)Put IDG on a suitable cart or carrier.

C. Installation (Ref. Fig. 401, 402)

R WARNING : THE IDG WEIGHS IN EXCESS OF 120 LBS. (54.43 KG). DROPPING IDG
R COULD CAUSE SERIOUS INJURY TO PERSONNEL.

(1)Install IDG on cradle hoist mechanism.

(2)Lubricate packing with oil (Material No. 03-002) and install in groove on IDG input splined shaft.

CAUTION : DO NOT LUBRICATE IDG INPUT SPLINED SHAFT WITH GREASE. GREASE IS NOT COMPATIBLE WITH OIL USED IN ENGINE GEARBOX SPLINE CAVITY.

(3)Remove protective covers from IDG and accessory gearbox opening.

CAUTION : DO NOT ALLOW INTEGRATED DRIVE GENERATOR TO HANG ON INPUT SHAFT DURING INSTALLATION. FAILURE TO SUPPORT INTEGRATED DRIVE GENERATOR PROPERLY OR BUMPING THE SHAFT CAN DAMAGE INPUT SEAL.

(4)Using a cradle hoist mechanism, position IDG on accessory gearbox mounting pad and support IDG to make certain no weight is put on input shaft.

R (5)Lubricate the quick attach-detach adapter tension bolt with oil Material
R No. 03-002.

R (6)Rotate QAD tension bolt to open QAD ring so that mark on QAD ring is aligned with mark on QAD engine adapter plate.

CAUTION : INCORRECT MOUNTING OF INTEGRATED DRIVE GENERATOR MAY CAUSE DAMAGE TO MATING PARTS.

R (7)Position IDG cradle hoist to allow lugs on integrated drive generator input flange to mate with QAD ring opening.

CAUTION : MAKE CERTAIN THAT QAD RING DOES NOT ROTATE OFF THE ALIGNMENT MARKS ON ADAPTER PLATE OR IDG HOUSING. INSTALLATION OF IDG CANNOT BE PERFORMED IF QAD RING HAS ROTATED OFF THE ALIGNMENT MARKS.

R (8)Check that alignment marks on IDG housing align with alignment marks on QAD adapter. All the IDG input flange lugs will be engaged by QAD ring when ring is tightened if IDG has been mounted correctly.

R (9)Tighten QAD tension bolt so QAD-ring-lugs fully engage IDG input flange lugs. Observe the action of the ring to make certain it does not bind or snag. TORQUE QAD tension bolt to between 325 and 350 lbf.in.(3.67 and 3.95 m.daN).

R (10)Tap exposed periphery of QAD ring with brass drift to center ring and prevent false torque readings. Check tension bolt torque value. If torque is less than 180 lbf.in.(2.03 m.daN), RETORQUE to between 240 and 264 lbf.in.(2.71 and 2.98 m.daN).

R (11)Repeat tap and torque check until torque valve does not drop below 180 lbf.in.(2.03 m.daN).

R (12)RETORQUE tension bolt to a final torque between 240 and 260 lbf.in.(2.71 and 2.94 m.daN) and wirelock tension bolt.

NOTE : Check the distance between ring lug and bracket of QAD ring. If the distance is less than 9/16 in. (14.28 mm) minimum (Ref. Fig. 402), (detail A), remove and replace QAD adapter. Check QAD adapter by shaking anti-drive end of IDG. If the IDG is loose, remove and replace QAD adapter.

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

R (13)Cut and remove lockwire from overflow drain plug and pressure fill plug.

R (14)Remove overflow drain plug from overflow drain port.

R (15)Lubricate packing with oil (Material No.C03-002) and install on overflow drain coupling.

CAUTION : USE DOUBLE-WRENCH METHOD WHEN TORQUING OIL LINES. IF THE DOUBLE-WRENCH METHOD IS NOT FOLLOWED, EXCESS TORQUE MAY BE TRANSFERRED TO INTEGRATED DRIVE GENERATOR FITTINGS, RESULTING IN DAMAGE TO INTEGRATED DRIVE GENERATOR BOSSES CAUSING EXTERNAL OIL LEAKS.

R (16)Install overflow drain coupling. TORQUE coupling to between 110 and 150 lbf.in.(1.24 and 1.29 m.daN).

R (17)Install dust cover on overflow drain coupling.

R (18)Remove pressure fill plug from pressure fill port.

R (19)Install pressure fill elbow coupling, packing, and drilled jamnut in pressure fill port. TORQUE jamnut to between 75 and 100 lbf.in.(0.85 1.13 m.daN).

R (20)Wirelock jamnut.

R (21)Install dust cover on pressure fill elbow coupling.

R (22)Install union and packing in IDG OIL-OUT boss. TORQUE union to between 130 and 175 lbf.in. (1.47 and 1.98 m.daN).

R (23)Install union and packing in IDG OIL-IN boss. TORQUE union to between 150 and 200 lbf.in. (1.69 and 2.26 m.daN).

R (24)Remove protectives covers and connect oil-in and oil-out tubes to unions.

R (25)TORQUE oil-in tube nut to between 900 and 1000 lbf.in.(10.17 and 11.30 m.daN).

R (26)TORQUE oil-out tube nut to between 900 and 1000 lbf.in.(10.17 and 11.30 m.daN).

R (27)TORQUE drain tube coupling to between 270 and 300 lbf.in.(3.05 and 3.39 m.daN).

CAUTION : ELECTRICAL CONNECTOR PLUG AND CONNECTOR PINS MUST BE ALIGNED BEFORE INSTALLATION TO PREVENT DAMAGE TO CONNECTOR AND/OR PINS.

R (28)Remove protective caps from IDG electrical connectors DG13A and DG13B. Tighten connectors fingertight plugs one-eighth turn and secure plugs and receptacle with lockwire.

R (29)Remove screws, washers and terminal block cover.

R (30)Remove terminal nuts and washers.

CAUTION : ROUND WASHERS MUST BE INSTALLED BETWEEN TERMINAL NUTS AND PHASE LEADS. DO NOT INSTALL ANY WASHERS UNDER PHASE LEADS. LOCALIZED RESISTANCE HEATING AND BURNING OF TERMINAL BLOCK WILL RESULT.

R (31)Install generator terminal lead assembly and phase leads (26) to IDG terminal block by matching N, T1, T2, T3 leads (26)to IDG terminal labels.
Install captive nut/washer (32) or washer (31) and nut (30). Torque captive nut/washer or nut to between 144 and 168 lbf.in. (1.63 and 1.90 m.daN) (Ref. Fig. 401).

R (32)Install terminal block cover and secure with washers and screws. TORQUE screws to between 20 and 22 lbf.in.(0.23 and 0.25 m.daN).

R (33)Service IDG (Ref. 12-13-24, P. Block 1).

D. Close-Up

(1)Remove safety clips and tags and close circuit breakers 1XT, 2XT, 3XT,

4XT, 15XU and 18XU.

(2)Remove all ground handling and maintenance equipment.

(3)Close L thrust reverser and fan cowl doors. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

E. Test

(1)Carry out IDG disconnect operational test (Ref. 24-11-00, P. Block 501).

(2)During engine first start, check :

- sealing of IDG oil system
- do a check of the oil level (Ref. 24-11-00, P. Block 601).
- IDG for correct operation by checking the frequency and voltage of the corresponding electrical network :
  - on panel 425VU, place AC parameter selector switch in GEN1 or GEN2 position according to the IDG to be checked :
    . voltage value displayed on the ECAM and on the voltmeter on panel 425VU must be 115VAC ± 5V.
    . frequency value displayed on the ECAM and on the frequencymeter on panel 425VU must be 400 Hz ± 5 Hz.

INTEGRATED DRIVE GENERATOR (IDG) - REMOVAL/INSTALLATION

WARNING : APPROVED HANDLING METHODS MUST BE USED DURING REMOVAL/INSTALLATION PROCEDURES TO PREVENT POSSIBLE INJURY TO PERSONNEL OR DAMAGE TO COMPONENT.

CAUTION : USE EXTREME CARE DURING REMOVAL/INSTALLATION PROCEDURES NOT TO KINK OR DENT FIRE SENSING ELEMENT CABLES INSTALLED ON ENGINES. PHYSICAL CONTACT CAN CAUSE HIDDEN DAMAGE.

NOTE : If the IDG is being removed for any cause or for a pressure differential indicator extended red button, remove the scavenge filter and check for damage, collapse, or indications that contaminated oil is bypassing the filter and entering the external circuit.
If the filter is damaged, collapsed, or contains indications of bypassing, remove and replace the external coolers and clean the external lines.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Container - 2 US Gallons (7.57 l)
R	B.	Bergen Mechanical Crimper (Optional) Model
R		M303, M305 or M307
R	C. RSE1001	Accessory Hoist (Optional to RSE1110)
R	D.	Packings
R	E.	Corrosion-Resistant Steel Lockwire
R	F.	Circuit Breaker Safety Clips
R	G.	Torque Wrench
		20 to 1000 lbf.in. (0.23 m.daN to 11.3 m.daN)
R	H. Material No.P03-001	Oils (Ref. 70-00-00)
R	J. Material No.P05-289	Special Materials (Ref. 70-00-00)
R	K. Material No.P05-291	Special Materials (Ref. 70-00-00)
R	L. Material No.P05-292	Special Materials (Ref. 70-00-00)
R	M. Material No.P06-007	Lubricants (Ref. 70-00-00)
	Referenced Procedures	
	- 12-13-24, P. Block 1	Electrical Power
	- 24-11-00, P. Block 501	IDG System
	- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, safety and tag circuit breakers for the appropriate engine and open L fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

R WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR. IN CASE OF EYE OR SKIN CONTACT, SEEK MEDICAL ATTENTION.

R CAUTION : ALLOW IDG TO COOL BEFORE ATTACHING DRAIN LINE. IF IDG IS NOT ALLOWED TO COOL, OIL IN THE IDG WILL BE HOT AND UNDER PRESSURE.

(3)On IDG, press to vent valve first to remove internal pressure from oil system.

R B. Removal (Ref. Fig. 401, 402)

(1)Disconnect electrical connectors DG13A and DG13B from IDG and install protective covers.

(2)Remove terminal block cover from IDG terminal block.

R (3)Disconnect generator electrical leads and replace terminal block cover.

R NOTE : The clamp, which secures oil inlet and outlet tubes together, can remain in place when these tubes are removed together. If necessary, remove clamp prior to removing oil tubes as separate units.

(4)Position container under oil inlet and outlet ports on IDG.

(5)Disconnect oil inlet and outlet tubes from IDG.

(6)Position container under oil inlet and outlet tubes at disconnect unions.

(7)Disconnect oil inlet and outlet tubes at these disconnect points and remove tubes from IDG.

(8)Place protective covers on all IDG open ports and oil inlet and outlet tubes.

R WARNING : THE IDG WEIGHS IN EXCESS OF 120 LBS. (54.43 kg). DROPPING IDG
R COULD CAUSE SERIOUS INJURY TO PERSONNEL.

R CAUTION : PRIOR TO PERFORMING THE FOLLOWING STEPS, VERIFY THAT IDG SUPPORT STAND IS SUPPORTING FULL WEIGHT OF THE IDG, AS LOOSE-
R NING THE QAD TENSION BOLT BEFORE THE IDG SUPPORT HOIST IS PROPERLY POSITIONED CAN CAUSE SEVERE DAMAGE TO EQUIPMENT.

R (9)Position RSE1110 or RSE1001 IDG support hoist under IDG to support full weight of IDG.

(10)Withdraw and strap IDG to support hoist.

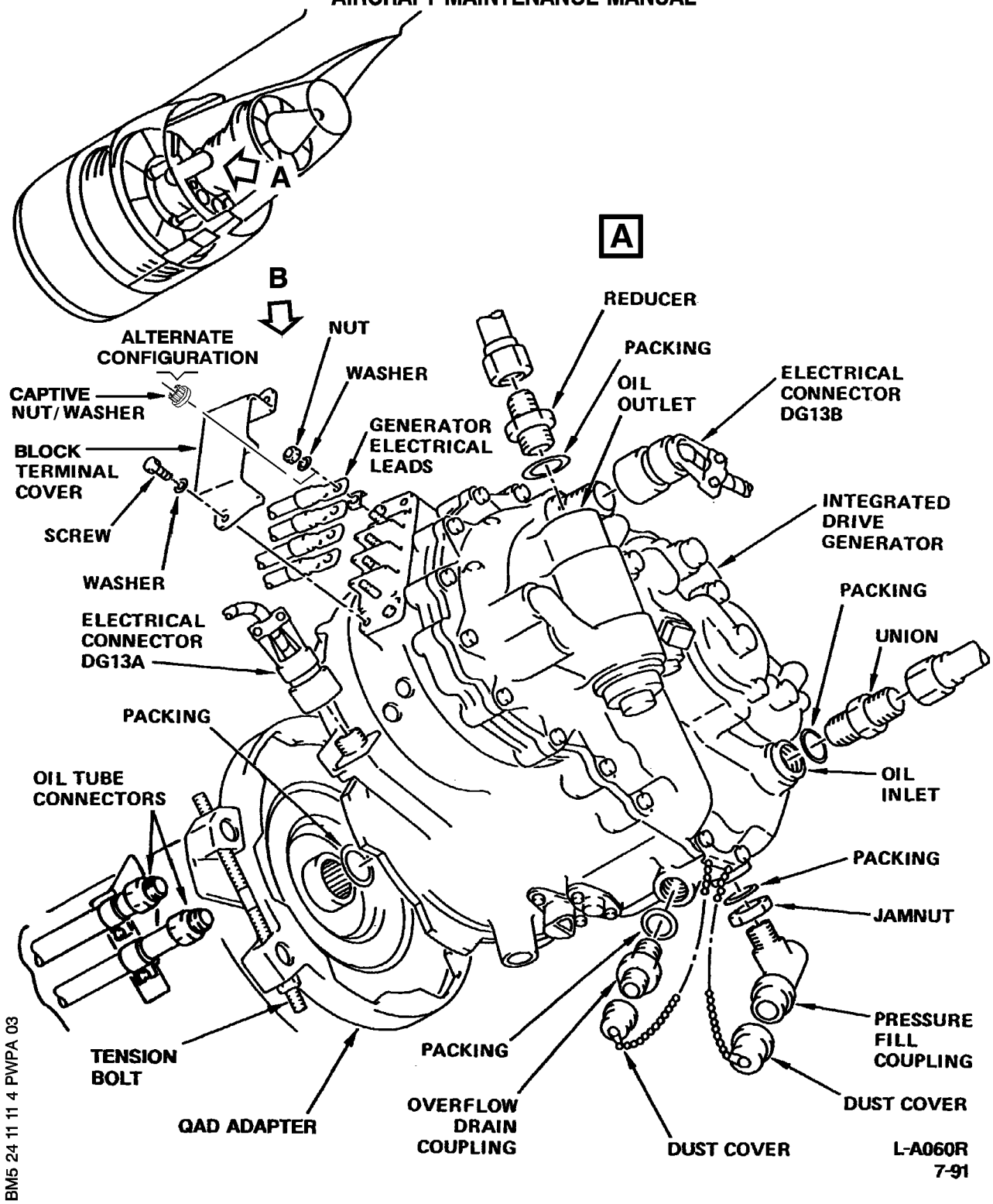
(a)Remove lockwire from Quick Attach/Detach (QAD) adapter kit tension bolt, loosen bolt and rotate QAD adapter ring in the counterclockwise direction until the index marks, at bottom edges of the IDG and adapter ring, are aligned.

(b)Withdraw IDG a minimum of 2.0 inches (50.8 mm) from main gearbox.

R (c)Lower IDG on IDG support stand sufficiently to facilitate the installation of holding strap which secures IDG to IDG support stand.

(11)With holding strap attached, lower IDG and remove.

(12)Place protective cover over QAD adapter ring.

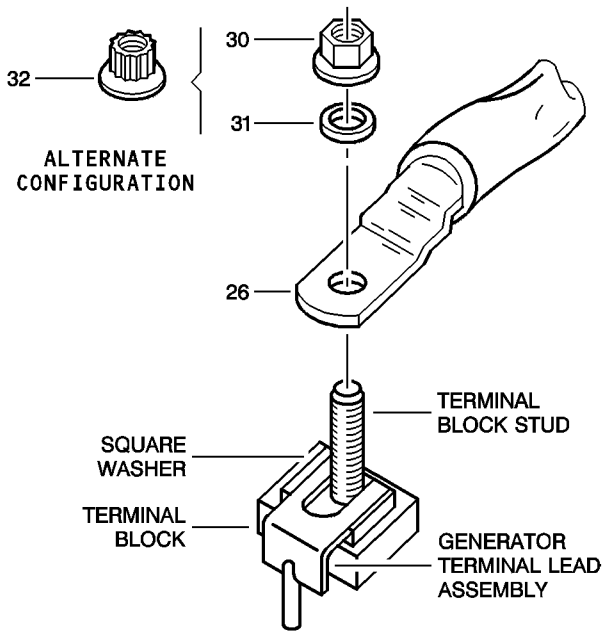


Integrated Drive Generator (Sheet 1/2)
Figure 401

R

B

PHASE LEAD INSTALLATION



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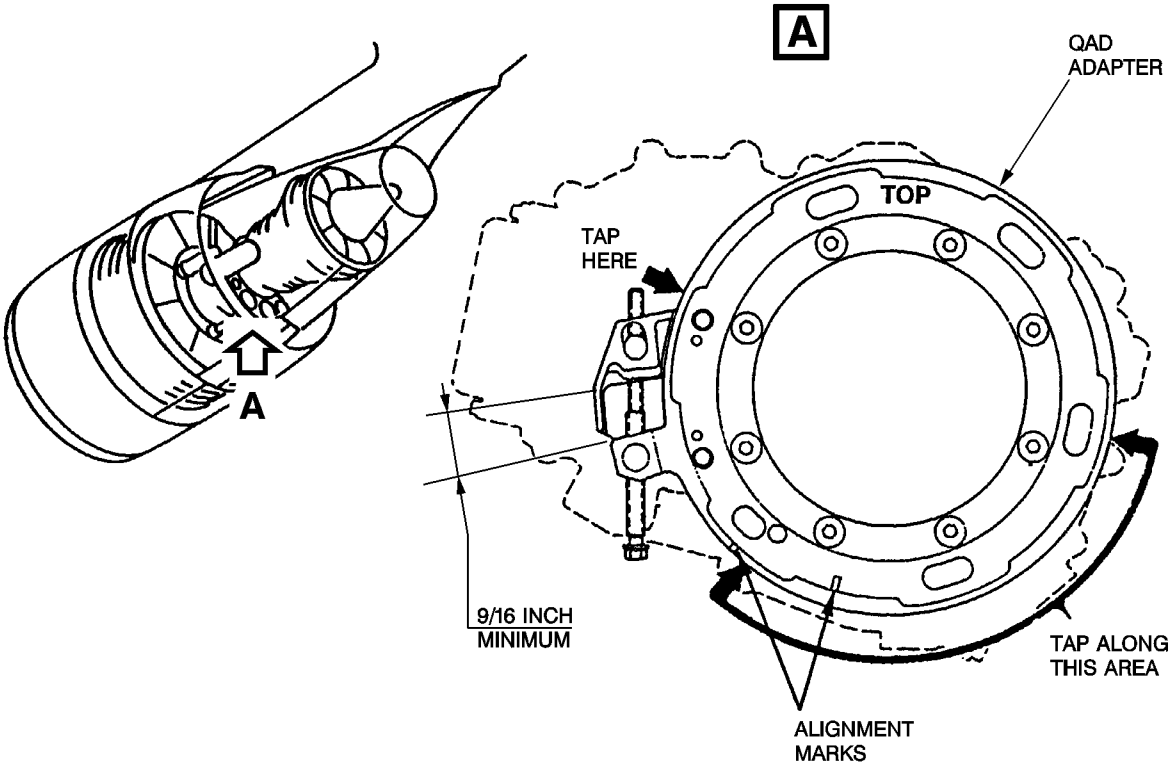
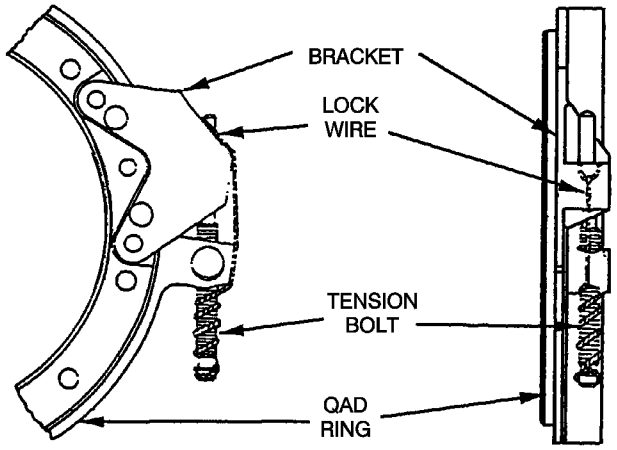
IDG. Phase Lead Installation (Sheet 2/2)
Figure 401

R





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IDG QAD Adapter Kit Installation
Figure 402

R

C. Installation (Ref. Fig. 401, 402)

(1)Remove protective cover from QAD adapter ring.

R (2)Lubricate the quick attach-detach adapter tension bolt with oil Material
R No.P03-001.

R (3)Remove all protective covers installed on IDG, and on oil inlet and outlet tubes.

WARNING : THE IDG WEIGHS IN EXCESS OF 120 LBS. (54.43 kg). DROPPING IDG COULD CAUSE SERIOUS INJURY TO PERSONNEL.

R (4)Position IDG on RSE1110 or RSE1001 IDG support hoist and attach holding strap.

R (5)Verify that pressure fill port coupling is installed. If necessary, install as follows :

NOTE : The pressure fill coupling must be installed before the IDG is installed because of insufficient clearance.

(a)Remove pressure fill plug.

(b)Install jamnut fingertight on pressure fill coupling.

(c)Apply Petroleum Jelly (Material No.P06-007), to packing and position on pressure fill coupling.

(d)Install pressure fill coupling fingertight and then align to desired direction.

(e)Hold pressure fill port coupling at the desired alignment and TORQUE jamnut to between 110 and 150 lbf.in. (1.23 and 1.68 m.daN).

(f)Verify that dust cover seal is installed, and install dust cover on pressure fill coupling.

R (6)Apply Engine Oil (Material No.P03-001), to packing and install packing IDG shaft.

R (7)Move QAD adapter ring counterclockwise until the alignment mark, on inside bottom of the QAD adapter ring, aligns with mark on inside face of QAD adapter mounting plate (Ref. Fig. 402).

R (8)Raise IDG to a height approximately two inches (50.8 mm) lower than the final installed level and remove holding strap.

R (9)With holding strap removed, continue raising IDG until the IDG gearshaft is centered on main gearbox spline.

R (10)Align index pin on IDG with alignment hole on QAD adapter ring.

R (11)Carefully move IDG into main gearbox and ensure that IDG gearshaft correctly engages main gearbox splines.

CAUTION : DO NOT LOWER IDG SUPPORT HOIST UNTIL IDG IS SECURELY LOCKED INTO THE QAD ADAPTER RING OR EQUIPMENT CAN BE SEVERELY DAMAGED.

R (12)Lock IDG to main gearbox with QAD adapter ring as follows :

(a)Rotate QAD adapter ring clockwise until tight.

(b)Tap around exposed perimeter of QAD adapter ring with brass drift. (Ref. Fig. 402)

(c)Initially TORQUE QAD tension bolt to between 325 and 350 lbf.in. (3.67 and 3.95 m.daN).

(d)Tap around exposed perimeter of QAD adapter ring with brass drift.

(e)Check QAD tension bolt torque. If less than 180 lbf.in. (2.03 m.daN), RETORQUE to between 240 and 264 lbf.in. (2.71 and 2.98 m.daN).

(f)Re-tap around exposed perimeter of QAD adapter ring with brass drift and check QAD tension bolt torque. If less than 180 lbf.in. (2.03 m.daN), RETORQUE to between 240 and 264 lbf.in. (2.71 and 2.98 m.daN).

(g)Continue tapping, checking and retorquing until the torque value does not drop below 180 lbf.in. (2.03 m.daN). When this value is achieved, **RETORQUE QAD** tension bolt to the final torque between 240 and 260 lbf.in. (2.71 and 2.94 m.daN).

(h)Verify minimum distance between ring lug and bracket of **QAD** ring is 0.56 in. (14.28 mm). If gap requirement is not achievable, remove and replace **QAD** adapter.

(j)Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292) the **QAD** tension bolt by winding safety wire around the full lenght of bolt. (Ref. Fig. 402).

R (13)Lower **IDG** support hoist and remove.

R (14)Verify that the oil inlet port union is properly installed. If necessary, install as follows :

(a)Remove oil inlet port plug.

(b)Apply Petroleum Jelly (Material No.P06-007), to packing and position on union.

(c)Install union in oil inlet port and **TORQUE** to between 150 and 200 lbf.in. (1.68 and 2.26 m.daN).

R (15)Verify that the oil outlet port reducer is properly installed. If necessary, install as follows :

(a)Remove oil outlet port plug.

(b)Apply Petroleum Jelly (Material No.P06-007), to packing and position on reducer.

(c)Install reducer in oil outlet port and **TORQUE** to between 130 and 175 lbf.in. (1.47 and 1.98 m.daN).

R (16)Verify that the overflow drain coupling is properly installed. If necessary, install as follows :

(a)Remove overflow drain plug.

(b)Apply Petroleum Jelly (Material No.P06-007), to packing and position on overflow drain coupling.

(c)Install coupling in overflow drain port and **TORQUE** to between 110 and 150 lbf.in. (1.23 and 1.68 m.daN).

(d)Verify that dust cover rubber seal is installed on overflow drain coupling and install dust cover.

R (17)Install oil inlet and outlet tubes as follows :

(a)Connect the oil inlet and outlet tubes and tighten all connectors fingertight.

(b)Verify that tubes are not stressed or warped out of place.

(c)If clamp has been removed, install clamp.

(d)**TORQUE** all connectors to between 900 and 1000 lbf.in. (10.17 and 11.30 m.daN).

R (18)Install generator terminal lead assembly and phase leads (26) to **IDG** terminal block by matching **N, T1, T2, T3** wire labels with corresponding terminal labels.

R (19)Install captive nut/washer (32) or washer (31) and nut (30). Torque captive nut/washer or nut to between 144 and 168 lbf.in. (1.63 and 1.90 m.daN).

R (20)Install terminal block cover on **IDG** with screws and washers and **TORQUE** screws to between 20 and 22 lbf.in. (0.23 and 0.25 m.daN)

(Ref. Fig. 401).

R (21)Connect electrical connectors DG13A and DG13B fingertight plus one-eighth turn.

R (22)Service IDG (Ref. 12-13-24, P. Block 1).

D. Close-Up

(1)Close L thrust reverser and fan cowl doors. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).

(2)Remove all ground handling and maintenance equipment.

(3)Close circuit breakers 1XT, 2XT, 3XT, 4XT, 15XU and 18XU.

E. Test

(1)Carry out an IDG disconnect operational test (Ref. 24-11-00, P. Block 501).

(2)At first engine start :

- check IDG oil system for correct sealing
- make certain IDG operates correctly by checking frequency and voltage of the corresponding generator :
  - on panel 425VU, place AC parameter selector switch in GEN1 or GEN2 position according to the IDG to be checked :
    . voltage value displayed on the ECAM and on the voltmeter on panel 425VU must be 115VAC ± 5V.
    . frequency value displayed on the ECAM and on the frequencymeter on panel 425VU must be 400 Hz ± 5 Hz.

OIL OUT CHECK VALVE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Lockwire
C.	Torque Wrench
D. Material No. 03-002	Oils (Ref. 20-31-00)
E. Material No. 04-008	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 71-13-00, P. Block 301	Cowl Door

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND ALLOW TO COOL IF NECESSARY.

(1) Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(2) On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

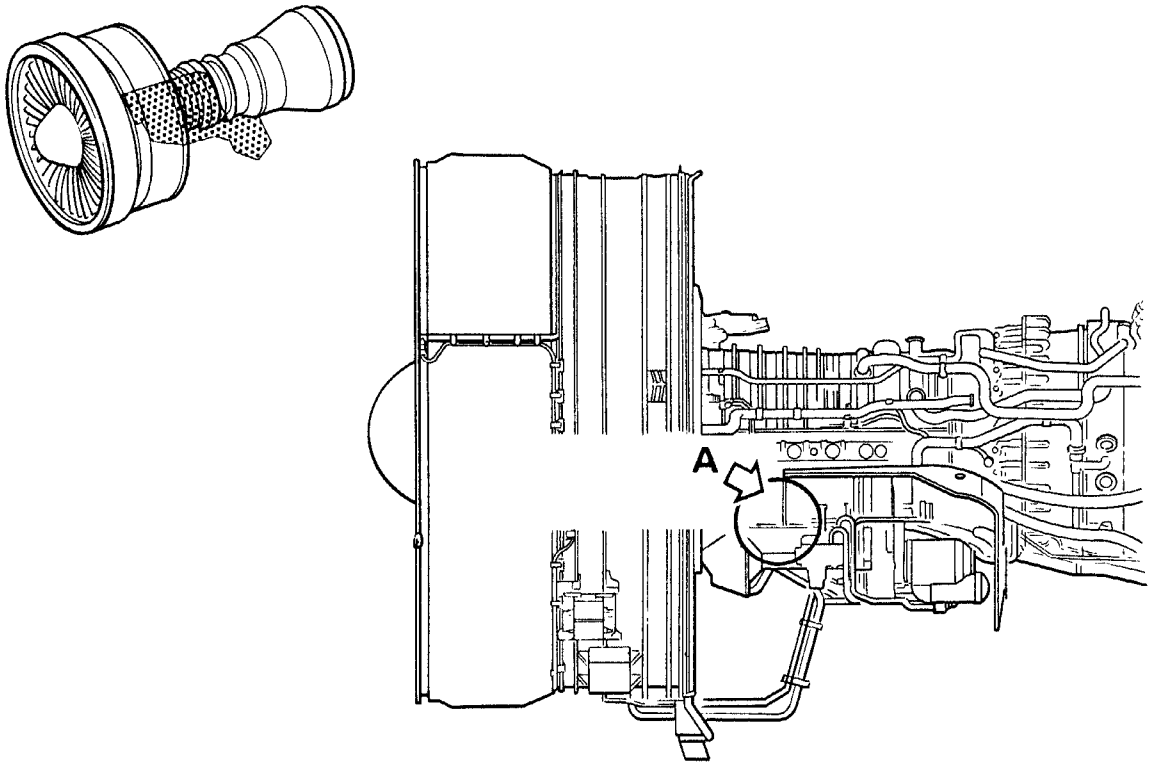
(1) Remove coupling nut from lower end of check valve.
(2) Remove coupling nut and O-ring from upper end of check valve. Discard O-ring.
(3) Remove loop clamp securing check valve to bracket and remove check valve.

C. Installation (Ref. Fig. 401)

(1) Lubricate a new O-ring with material No. 04-008 or material No. 03-002 and install on the check valve.
(2) Secure check valve to bracket using loop clamp, bolt, washer, and nut. TORQUE nut to between 55 and 70 lbf. in. (0.62 and 0.79 m.daN).
(3) Install coupling nut to upper end of check valve and TORQUE nut to between 900 and 1092 lbf. in. (10.17 and 12.32 m.daN).
(4) Install coupling nut to lower end of check valve and TORQUE nut to between 900 and 1092 lbf. in. (10.17 and 12.32 m.daN).

D. Close-Up

(1) Check oil level in IDG (Ref. 24-11-00, P. Block 601) and top up if necessary (Ref. 12-13-24, P. Block 1).
(2) Close left thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



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IDG Oil Out Check Valve
Figure 401

VENT VALVE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Lockwire
C.	Torque Wrench
D. Material No. 03-002	Oils (Ref. 20-31-00)
E. Material No. 04-008	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Door

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND ALLOW TO COOL IF NECESSARY.

(1)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(2)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(1)Cut and remove lockwire from vent valve.

(2)Remove vent valve and O-ring. Discard O-ring.

C. Installation

(1)Install new O-ring lubricated with material No. 04-008 or oil Material No. 03-002 on the vent valve.

(2)Install vent valve on IDG.

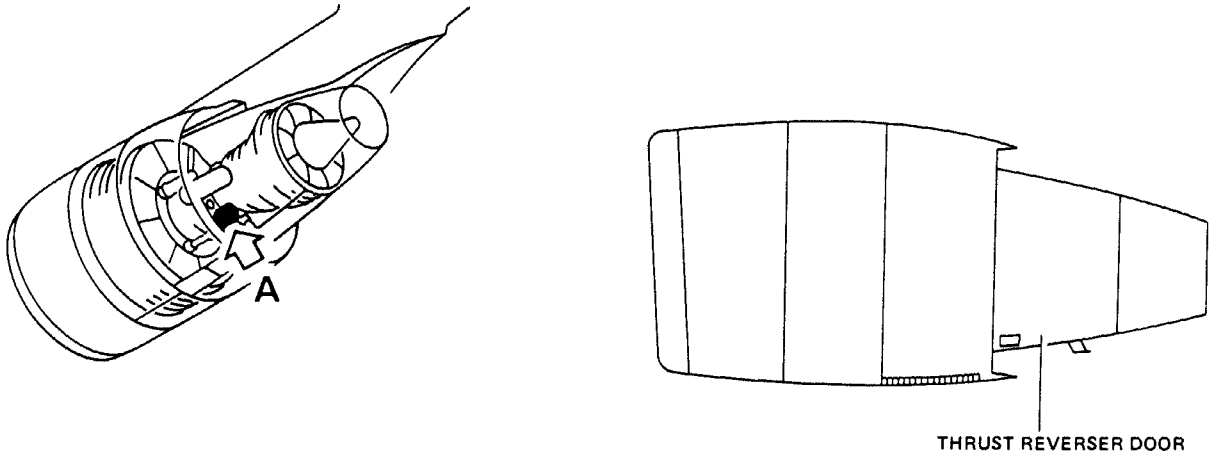
(3)TORQUE valve to between 60 and 70 lbf.in.(0.68 and 0.79 m.daN).

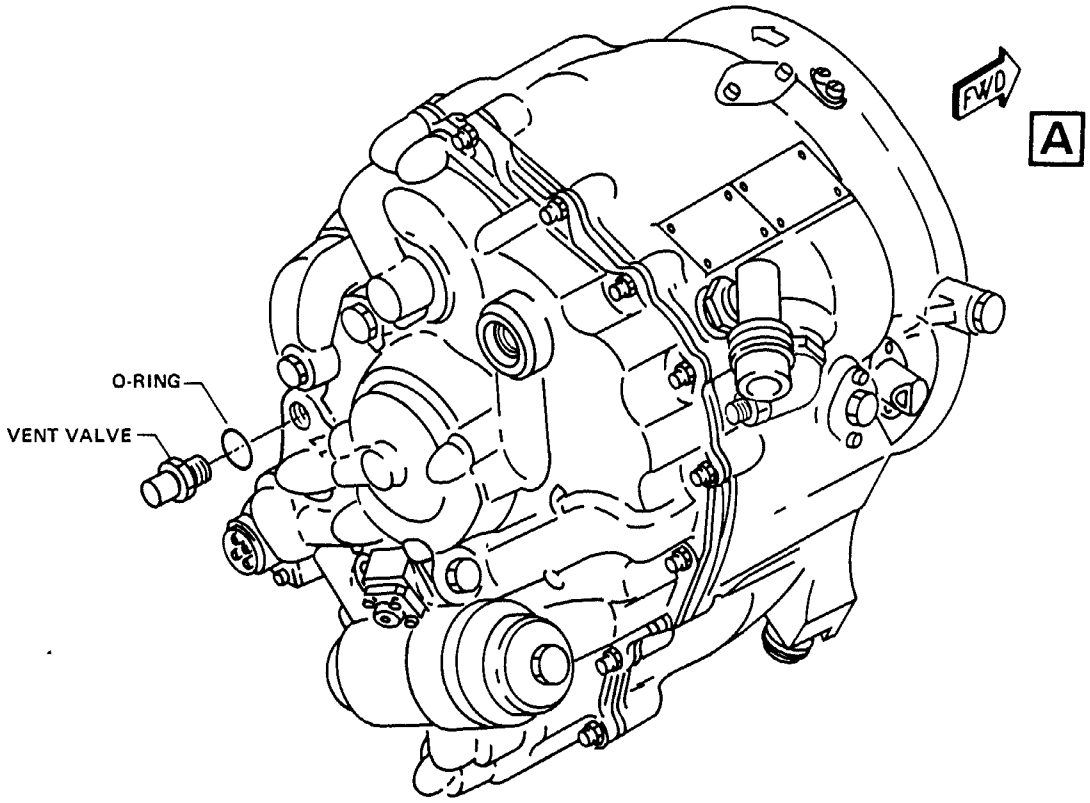
(4)Wirelock vent valve.

D. Close-Up

(1)If necessary top up IDG (Ref. 12-13-24, P. Block 1).

(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.





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IDG - Vent Valve
Figure 401

VENT VALVE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Lockwire
C.	Torque Wrench
D. Material No. 03-002	Oils (Ref. 20-31-00)
E. Material No. 04-008	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Door

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND ALLOW TO COOL IF NECESSARY.

(1)Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(2)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

WARNING : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(1)Cut and remove lockwire from vent valve.

(2)Remove vent valve and O-ring. Discard O-ring.

C. Installation

(1)Install new O-ring lubricated with material No. 04-008 or oil Material No. 03-002 on the vent valve.

(2)Install vent valve on IDG.

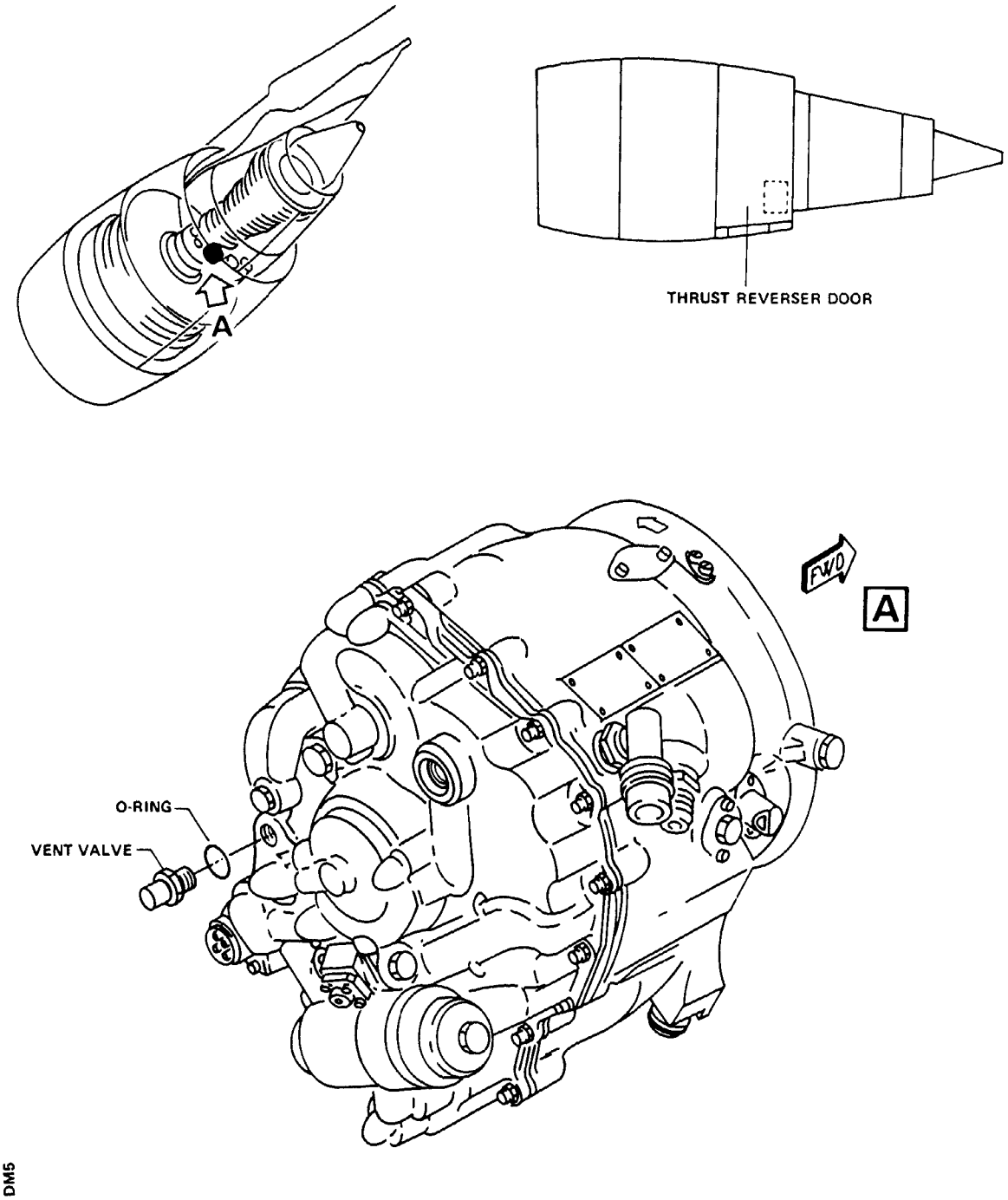
(3)TORQUE valve to between 60 and 70 lbf.in.(0.68 and 0.79 m.daN).

(4)Wirelock vent valve.

D. Close-Up

(1)If necessary top up IDG (Ref. 12-13-24, P. Block 1).

(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



IDG-Vent Valve
Figure 401

PRESSURE DIFFERENTIAL INDICATOR REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit breaker safety clips
B.	Torque wrench
C. 98A12001017000	Tank-Engine Oil Filling Up (Portable type)
C. or	
V. DH13PM	Tank-Engine Oil Filling Up (Portable type)
D. Material No. 03-002	Oil (Ref. 20-31-00)
E. Material No. 04-008	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Door

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY CHECK OIL TEMPERATURE AND ALLOW TO COOL IF NECESSARY.

(1)Open, safety and tag circuit breakers for the appropriate engine and open LH thrust cowl door (Ref. 71-13-00, P. Block 301).

(2)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

(1)Remove the four screws from pressure differential indicator

(2)Remove pressure differential indicator and discard O-Rings.

C. Installation

(1)Install new O-Rings lubricated with material No. 04-008 or with Material No. 03-002 on pressure differential indicator.

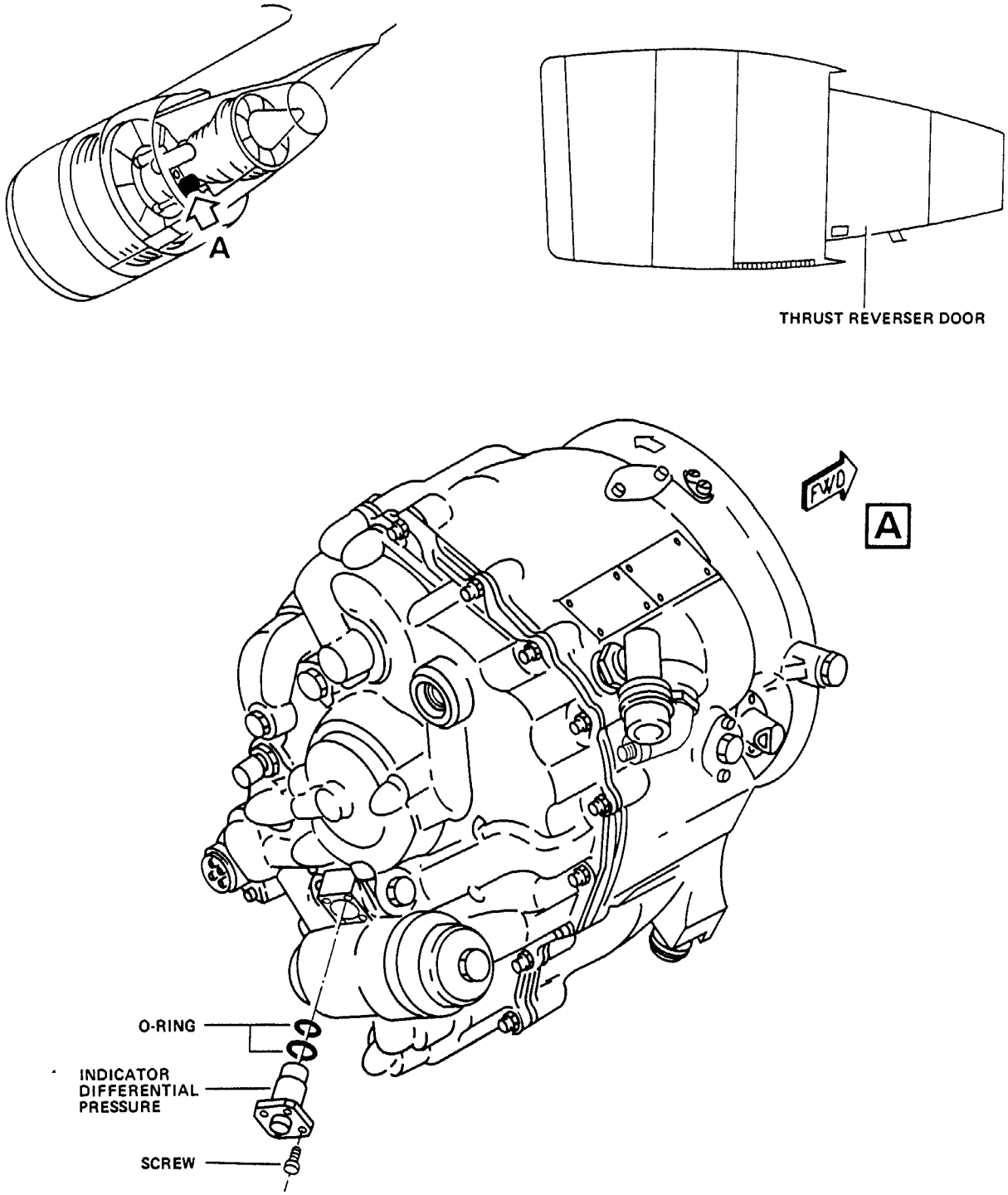
(2)Install pressure differential indicator and screws on IDG.

(3)TORQUE screws to between 7.5 and 8 lbf.in. (0.085 and 0.09 m.daN).

D. Close-Up

(1)Top-up IDG if necessary (Ref. 12-13-24, P. Block 1)

(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



IDG - Pressure Differential Indicator
Figure 401

PRESSURE DIFFERENTIAL INDICATOR REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit breaker safety clips
B.	Torque wrench
C. 98A12001017000	Tank-Engine Oil Filling Up (Portable type)
C. or	
V. DH13PM	Tank-Engine Oil Filling Up (Portable type)
D. Material No. 03-002	Oil (Ref. 20-31-00)
E. Material No. 04-008	Common Grease (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Door

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY CHECK OIL TEMPERATURE AND ALLOW TO COOL IF NECESSARY.

(1)Open, safety and tag circuit breakers for the appropriate engine and open left thrust cowl door (Ref. 71-13-00, P. Block 301).

(2)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

(1)Remove the four screws from pressure differential indicator

(2)Remove pressure differential indicator and discard O-Rings.

C. Installation

(1)Install new O-Rings lubricated with material No. 04-008 or with Material No. 03-002 on pressure differential indicator.

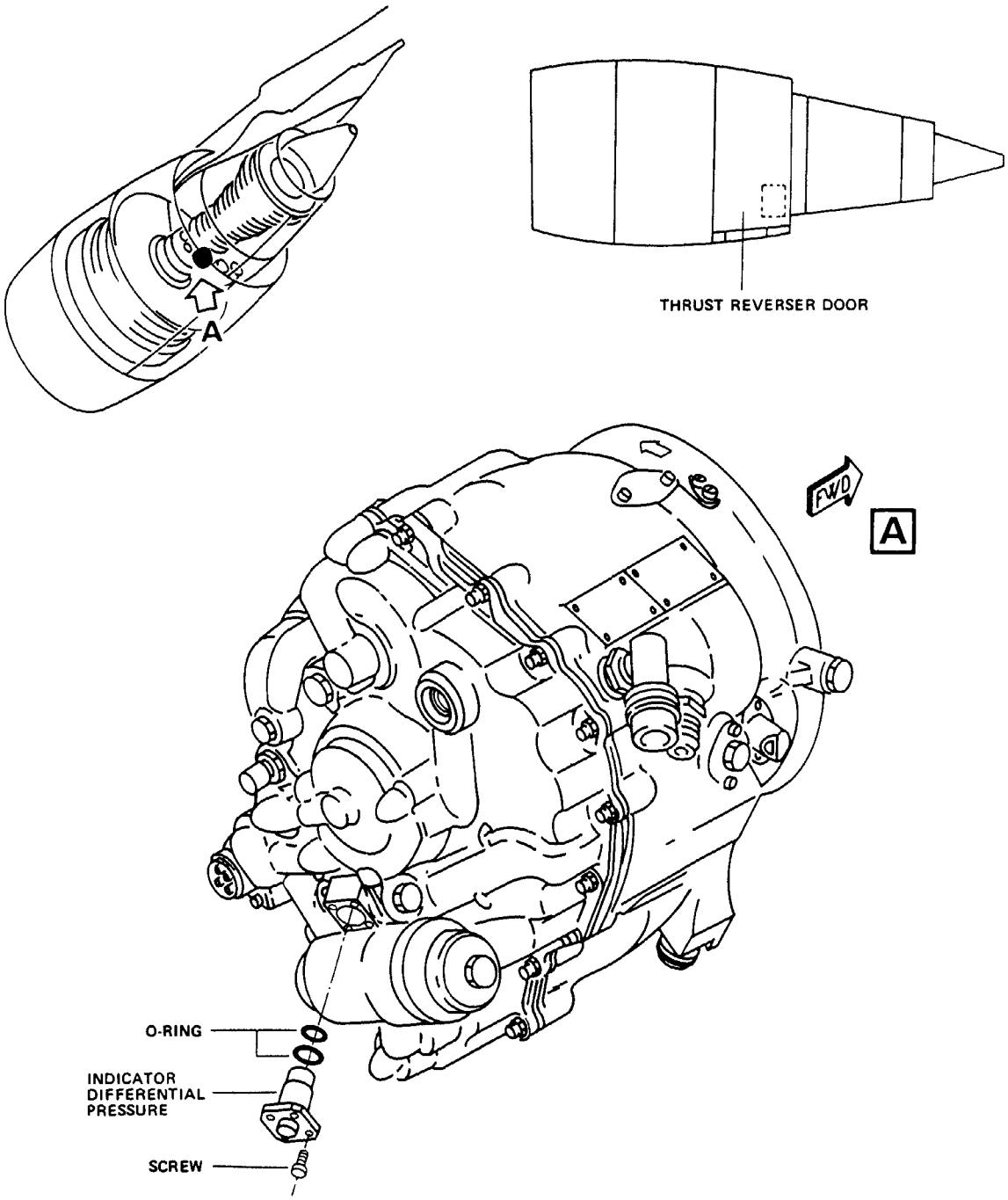
(2)Install pressure differential indicator and screws on IDG.

(3)TORQUE screws to between 7.5 and 8 lbf.in. (0.085 and 0.09 m.daN).

D. Close-Up

(1)Top-up IDG if necessary (Ref. 12-13-24, P. Block 1)

(2)Close LH thrust reverser cowl door (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.



IDG - Pressure Differential Indicator
Figure 401

QUICK ATTACH/DETACH KIT - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Gasket
C. Material No. 03-002	Oils (Ref. 20-31-00)
D. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 24-11-11, P. Block 401	IDG System

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG 1	3XT	206/D20
22VU	ELEC/DISC/IDG 2	4XT	206/D21
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN 2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, safety and tag circuit breakers for the appropriate engine and open L thrust reverser door (Ref. 71-13-00, P. Block 301).

(3)Remove integrated drive generator (Ref. 24-11-11, P. Block 401).

B. Removal

(Ref. Fig. 401)

(1)Remove screws attaching QAD kit to the main gearbox and remove QAD kit.

(2)Remove and discard gasket from QAD adapter.

(3)Install protective cap on QAD mounting surface on main gearbox.

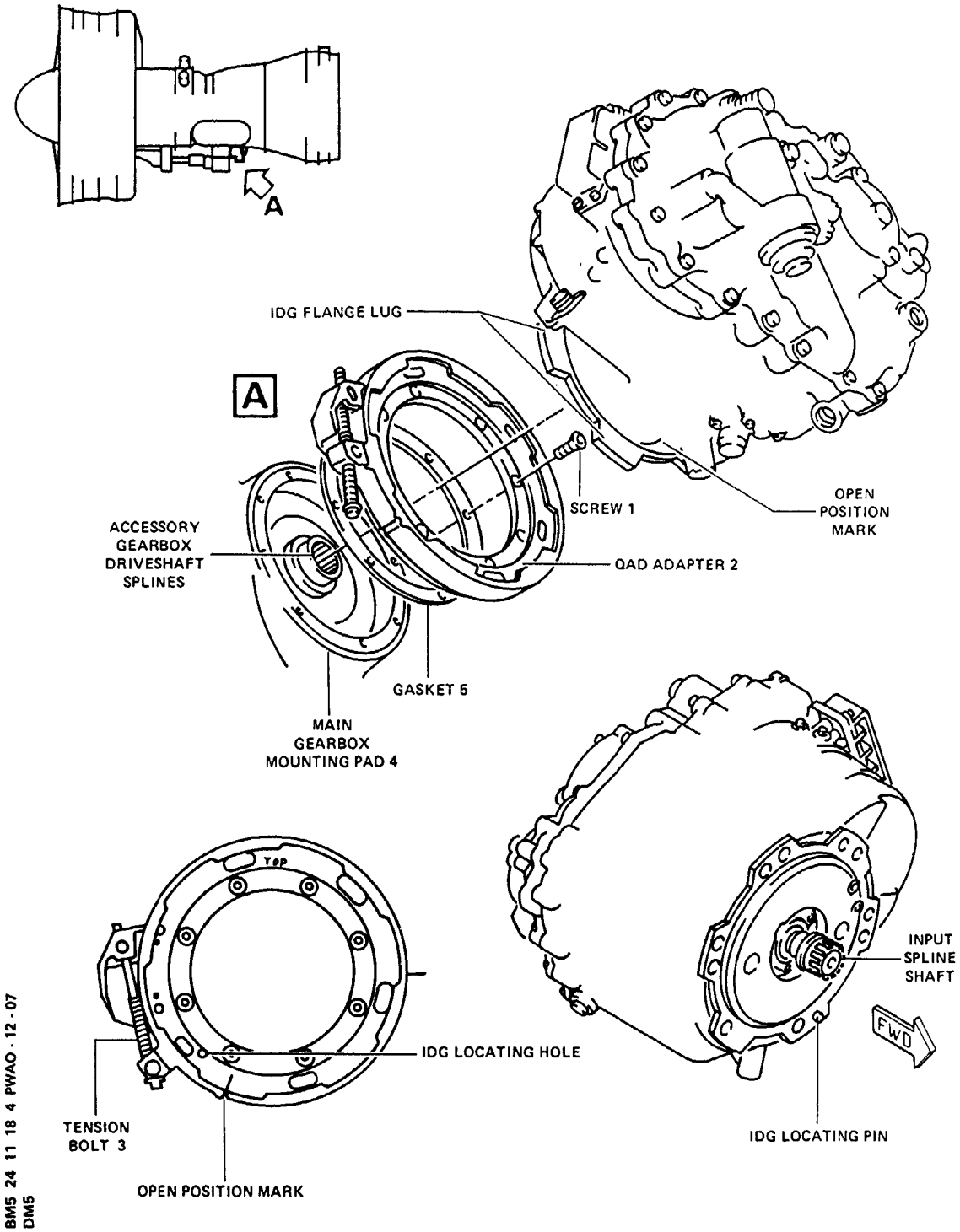
C. Installation (Ref. Fig. 401)

CAUTION : LUBRICATE QUICK ATTACH-DETACH ADAPTER TENSION BOLT BEFORE INSTALLING ADAPTER ON ENGINE ACCESSORY GEARBOX MOUNTING PAD. FAILURE TO LUBRICATE THE TENSION BOLT WILL CAUSE EXCESSIVE WEAR TO TENSION BOLT AND BRACKET.

CAUTION : DO NOT ALLOW LUBRICANT TO BUILD UP IN QAD ADAPTER DOWEL PIN HOLES AND SCREW HOLES. ACCESSORY GEARBOX DAMAGE COULD RESULT FROM INCREASED PRESSURE CAUSED BY LUBRICANT BUILD-UP INSTALLATION AND TORQUING OF SCREWS.

(1)Brush a thin film of material No. 04-004 or oil material No. 03-002 on the tension bolt (3) before installing QAD adapter (2) on main gearbox mounting pad (4).

(2)Remove protective caps from main gearbox mounting pad (4).



IDG Quick-Attach/Detach Kit
Figure 401

(3)Position QAD adapter (2) and gasket (5) on the main gearbox mounting pad (4), with alignment hole in QAD adapter (2).
CAUTION : TO PREVENT INDUCING LOADS INTO THE DRIVE PAD CARBON SEAL, CARE SHOULD BE TAKEN TO PROPERLY ALIGN AND SUPPORT THE COMPONENT DURING INSTALLATION.
(4)Install QAD adapter (2) on engine main gearbox mounting pad (4).
NOTE : The word TOP on the QAD adapter must be in the 12 o'clock position for the QAD adapter to be properly installed.
R (5)Secure QAD adapter (2) and gasket (5), with screws (1). TORQUE screws
R to between 23 and 25 lbf.ft. (3.12 and 3.39 m.daN).

D. Close-Up
(1)Install integrated drive generator (Ref. 24-11-11, P. Block 401).
(2)Close circuit breakers 3XT, 4XT, 15XU and 18XU.
(3)Close L thrust reverser door (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers.

QUICK ATTACH/DETACH KIT (IDG) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No. 03-002	Oils (Ref. 20-31-00)
C. Material No.C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedures	
- 24-11-11, P. Block 401	IDG System
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG 1	3XT	206/D20
22VU	ELEC/DISC/IDG 2	4XT	206/D21
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, safety and tag circuit breakers for the appropriate engine and open L fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(3)Remove integrated drive generator (Ref. 24-11-11, P. Block 401).

B. Removal

(Ref. Fig. 401)

(1)Remove screws attaching QAD adapter and gasket to accessory gearbox mounting pad and remove adapter and gasket.

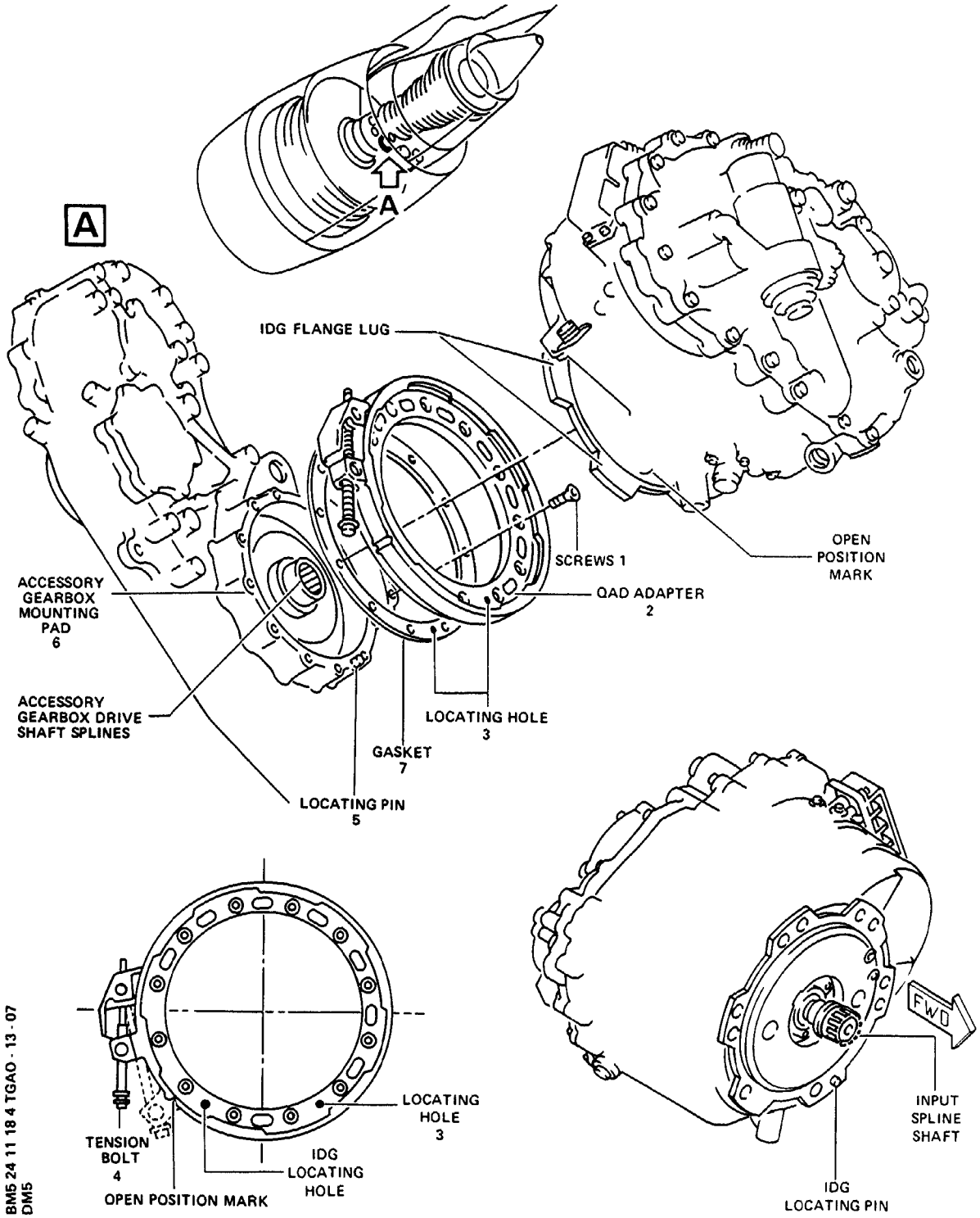
(2)Install protective cap on gearbox mounting pad.

C. Installation (Ref. Fig. 401)

CAUTION : LUBRICATE QUICK ATTACH-DETACH ADAPTER TENSION BOLT BEFORE INSTALLING ADAPTER ON ENGINE ACCESSORY GEARBOX MOUNTING PAD. FAILURE TO LUBRICATE TENSION BOLT WILL CAUSE EXCESSIVE WEAR TO TENSION BOLT AND BRACKET.

CAUTION : DO NOT ALLOW LUBRICANT TO BUILD UP IN QAD ADAPTER DOWEL PIN HOLES AND SCREW HOLES. ACCESSORY GEARBOX DAMAGE COULD RESULT FROM INCREASED PRESSURE CAUSED BY LUBRICANT BUILD-UP DURING INSTALLATION AND TORQUING OF SCREWS.

(1)Brush a thin film of Material No. C02-019 or oil material No. 03-002 on tension bolt (4) before installing QAD adapter (2) on accessory gearbox mounting pad (6).



IDG Quick Attach/Detach Adapter Kit
Figure 401

(2)Remove protective caps from accessory gearbox mounting pad (6)
(3)Position QAD adapter (2) and gasket (7) on accessory gearbox mounting pad (6), alignment pin on accessory gearbox mounting pad (6) with alignment hole in QAD adapter (2).
(4)Install QAD adapter (2) on engine accessory gearbox mounting pad (6).
NOTE : The word TOP on the QAD adapter must be in the 12 o'clock position for QAD adapter to be properly installed.
R (5)Secure QAD adapter (2), gasket (7), and accessory gearbox mounting pad
R (6) with screws (1). TORQUE screws to between 23 and 25 lbf.ft.
R (3.12 and 3.39 m.daN).

D. Close-Up
(1)Install integrated drive generator (Ref. 24-11-11, P. Block 401).
(2)Close circuit breakers 3XT, 4XT, 15XU and 18XU.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers.

R QUICK ATTACH/DETACH KIT - REMOVAL/INSTALLATION

R 1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Gasket
C. Material No.P03-001	Oils (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 24-11-11, P. Block 401	IDG System

R 2. Procedure

R A. Job Set-Up

R WARNING : TAKE PRECAUTIONARY MEASURES IF IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

R (1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG 1	3XT	206/D20
22VU	ELEC/DISC/IDG 2	4XT	206/D21
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN 2/GCU/BACK UP/SUPPLY	18XU	331/V81

R (2)Open, safety and tag circuit breakers for the appropriate engine and open L thrust reverser door (Ref. 71-13-00, P. Block 301).

R (3)Remove integrated drive generator (Ref. 24-11-11, P. Block 401).

R B. Removal

R (Ref. Fig. 401)

R (1)Remove screws attaching QAD adapter kit to the main gearbox and remove QAD adapter kit.

R (2)Install protective cover on main gearbox.

R (3)Remove and discard gasket from QAD adapter kit.

R C. Installation (Ref. Fig. 401)

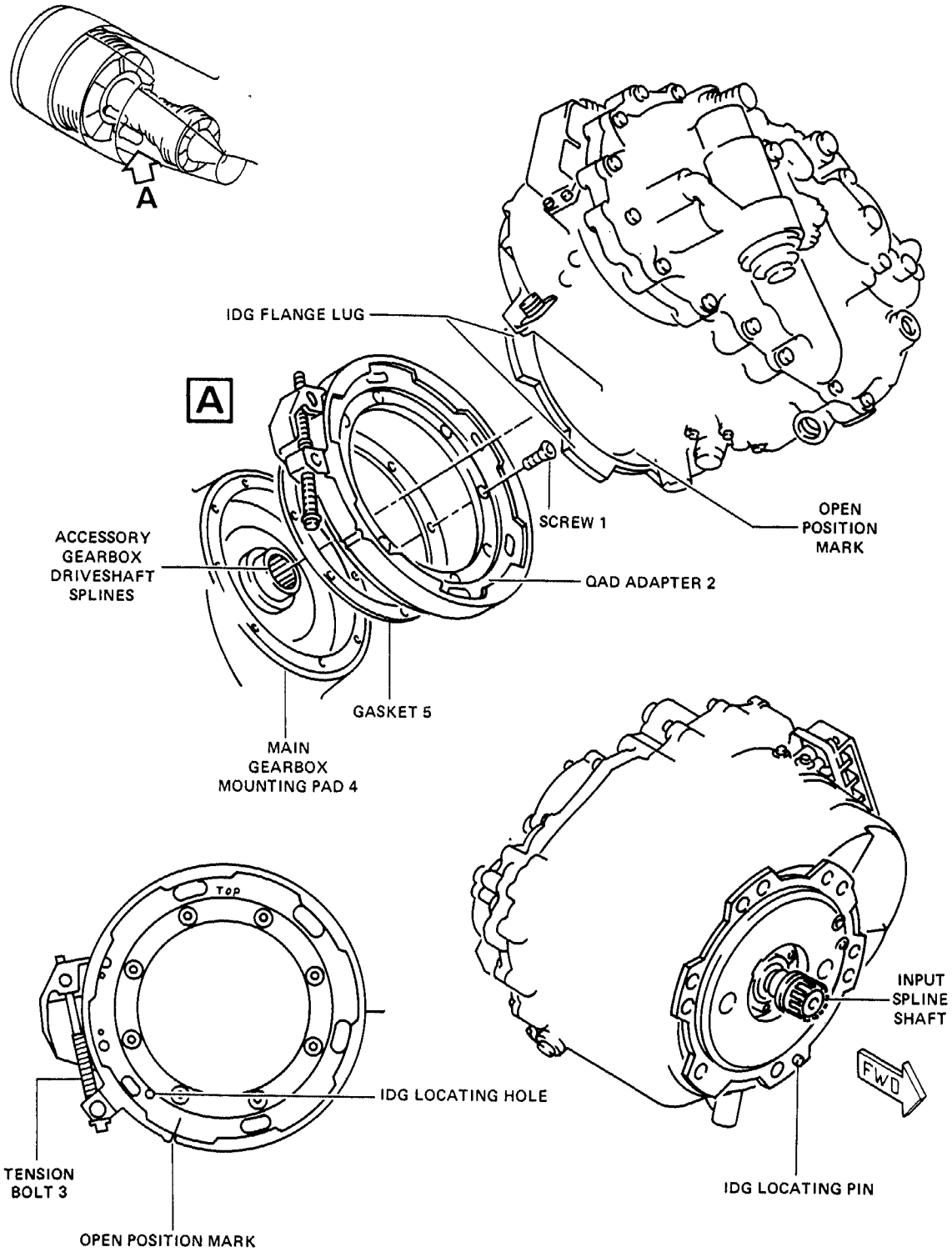
R NOTE : Before installation, you can clean seal face of main gearbox to remove coke or scoring (Ref. 72-65-01, P. Block 701).

R (1)Remove protective cover from main gearbox.

R (2)Position gasket on DAQ adapter kit with alignment hole in gasket aligned with QAD adapter.

R CAUTION : LUBRICATE THE QUICK ATTACH-DETACH ADAPTER TENSION BOLT BEFORE INSTALLING THE ADAPTER ON THE GEARBOX MOUNTING PAD. FAILURE TO LUBRICATE THE TENSION BOLT WILL CAUSE EXCESSIVE WEAR TO THE TENSION BOLT AND BRACKET.

R CAUTION : DO NOT ALLOW LUBRICANT TO BUILD UP IN THE QAD ADAPTER ALIGNMENT HOLE AND SCREW HOLES. GEARBOX DAMAGE MAY RESULT FROM INCREASED PRESSURE CAUSED BY LUBRICANT BUILD-UP DURING INSTALLATION AND TORQUING OF SCREWS.



IDG Quick-Attach/Detach Kit
Figure 401

R

R (3)Apply thin film of lubricant Material No.P03-001 to QAD adapter tension bolt.
R (4)Position QAD adapter kit so that index pin on main gearbox mates with alignment hole in QAD adapter ring, hold in position, and install mounting screws fingertight.
R NOTE : The word "TOP" on the QAD adapter must be in the 12 o'clock position for the adapter to be properly installed.
R (5)Tap around perimeter of QAD adapter kit with brass drift until kit is fully seated.
R (6)TORQUE screws to between 23 and 25 lbf.ft. (3.12 and 3.39 m.daN).

R D. Close-Up
R (1)Install integrated drive generator (Ref. 24-11-11, P. Block 401).
R (2)Close circuit breakers 3XT, 4XT, 15XU and 18XU.
R (3)Close L thrust reverser door (Ref. 71-13-00, P. Block 301).
R (4)Remove safety clips and tags and close circuit breakers.

AIR/OIL HEAT EXCHANGER (IDG) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Packings
C.	Torque Wrench 50 to 430 lbf.in.(0.56 to 4.85 m.daN)
D.	Corrosion Resistant Steel Lockwire.
E.	Protective Covers and Blanking Caps
F. Material No.C03-017	Finishes and Protective Coatings (Ref. 70-00-00)
G. Material No.C02-023	Anti-seize Compounds, Lubricants Oils (Ref. 70-00-00)
H. Material No.C01-056	Adhesives, Plastics, Sealants (Ref. 70-00-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 70-00-00, P. Block 201	Standard Practices
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V80

(2)Open R fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

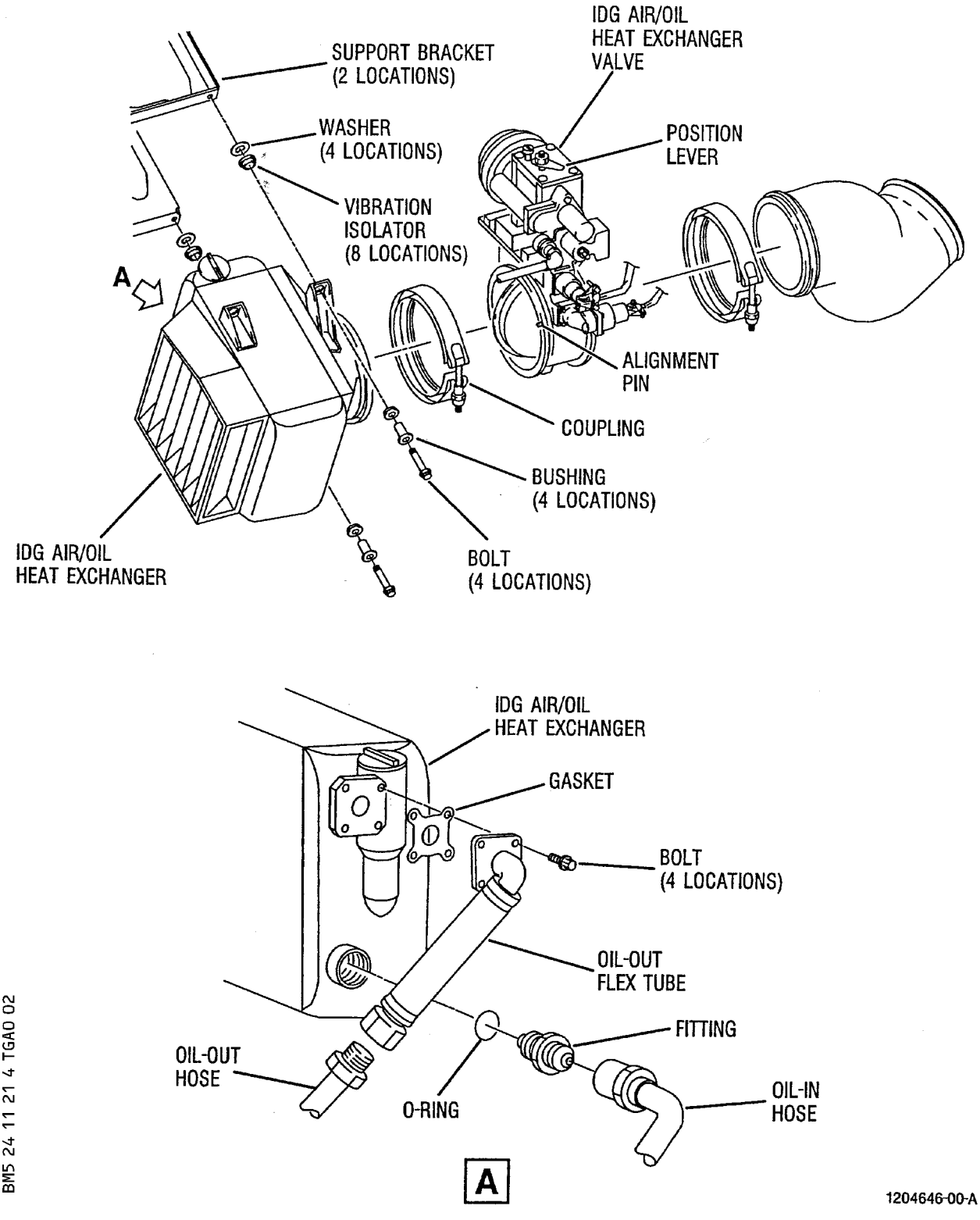
(3)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal

(Ref. Fig. 401)

(1)Place a suitable container under exchanger and disconnect the OIL IN hose from the union found on the inboard surface of the heat exchanger. Allow oil to drain.

(2)Remove bolts and nut from OIL OUT port flange and disconnect the OIL OUT port hose. Allow to drain. Inspect the gasket



IDG Air/Oil Heat Exchanger
Figure 401

(Ref. 70-00-00, P. Block 201).

(3)Remove bolts, retainers, isolators, washers, and nuts connecting exchanger to bracket.

NOTE : Possible loss of washers may occur when removing the four attach bolts.

(4)Remove coupling attaching exchanger to air control valve and remove exchanger.

(5)Install protective covers and blanking caps on cooler, air control valve, and open hoses.

C. Installation (Ref. Fig. 401)

(1)Remove protective covers and blanking caps from exchanger, air control valve, and hoses.
Apply primer, C03-017, to mating surfaces of exchanger and air control valve.

(2)Position exchanger on air control valve, inserting alignment pin in alignment hole in valve flange. Install coupling and TORQUE coupling nut to between 55 and 70 lbf.in.(0.62 and 0.79 m.daN).

(3)Secure washers to mounting bracket using Material No.C01-056 to prevent loss during installation of IDG AIR/OIL Heat Exchanger.

(4)Install bolts, retainers, isolators, washers and nuts which connect exchanger to bracket. TORQUE bolts to between 55 and 70 lbf.in.(0.62 and 0.79 m.daN).

(5)Connect outlet hose to OIL OUT port flange with gasket, bolts and nuts. TORQUE bolts to between 24 and 27 lbf.in.(0.27 and 0.31 m.daN).

(6)Connect OIL IN hose to OIL IN port union. TORQUE coupling to between 360 and 400 lbf.in.(4.07 and 4.52 m.daN).

NOTE : If union and packing were removed from heat exchanger, reinstall with new packing. TORQUE to between 230 and 270 lbf.in. (2.60 and 3.05 m.daN).

D. Close-Up

(1)Replenish IDG with oil Material No.C02-023 (Ref. 12-13-24, P. Block 1).

(2)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301), remove safety clips and tags and close circuit breakers.

(3)Remove safety clips and tags and close circuit breakers 1XT, 2XT, 3XT, 4XT, 15XU and 18XU.

E. Test

(1)Check IDG oil system for leakage at first engine start up (Ref. 24-11-00, P. Block 601).

(2)Check oil level in IDG (Ref. 24-11-00, P. Block 601) and top up if necessary (Ref. 12-13-24, P. Block 1).

AIR/OIL HEAT EXCHANGER (IDG) - REMOVAL/INSTALLATION

R 1. Prerequisites

R Remove the fan exit liner segment (inner rear) that is at 4 o'clock
R (Ref. 72-23-05, P. Block 401).

R 2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
R B.	Bergen Mechanical Crimper (Optional) Model
R	M303, M305 orM307
C.	Packings
D.	Corrosion Resistant Steel Lockwire
E.	Torque Wrenches
R F.	Warning Notice
R G.	Container Minimum Capacity of 5 US
R	Gallons (19 liters)
R H. PWA85853	Adapter, Torque
R J. PWA87505	Positioner
R K. PWA87506	Cover, Protective
R L. Material No.P03-001	Oils, (Ref. 70-00-00)
R M. Material No.P05-289	Special Materials (Ref. 70-00-00)
R N. Material No.P05-291	Special Materials (Ref. 70-00-00)
R P. Material No.P05-292	Special Materials (Ref. 70-00-00)
R Q. Material No.P06-002	Lubricants (Ref. 70-00-00)
R R. Material No.P06-003	Lubricants (Ref. 70-00-00)
R S. Material No.P06-015	Lubricants (Ref. 70-00-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 70-00-00, P. Block 201	Standard Practices - Engine - General
- 71-13-00, P. Block 301	Cowl Doors
- 72-23-05, P. Block 401	Fan Exit Liner Segments

R 3. Procedure

A. Job Set-Up

R (1)On the FIRE control module (overhead panel) of the engine concerned,
R pull the fire handle and install a warning notice to prohibit actuation
R in normal position (pushed) while maintenance is in progress.

R (2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFRT/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

R (3)Open, safety and tag circuit breakers for the appropriate engine and
R open right thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
R (4)On IDG, press vent valve prior to removing internal pressure from oil
system.

B. Removal (Ref. Fig. 401)

CAUTION : DO NOT HANDLE AIR/OIL HEAT EXCHANGER AND VALVE BY INLET COLLARS. INLET COLLARS ARE NOT INTEGRAL PARTS OF VALVE HOUSING.

R (1)Disconnect the DV216 connector from the receptacle attached to the
R bracket (22). Install the protective cover.
R (2)Remove two bolts (20) and harness bracket (21) securing valve cable
receptacle to bracket on stator vane actuator support (22). Remove
receptacle from bracket. Install protective closure.
R (3)Remove bolts, nuts and clamps securing harness to return tube.
R (4)Remove lockwire and disconnect air/oil cooler valve hydraulic tube (CP13)
R and air/oil cooler valve return tube (CR12) at heat exchanger adapters.
R NOTE : Be prepared to catch fuel in container with a minimum capacity of
R 5 US Gallons (19 liters).
NOTE : Hold bulkhead adapters with wrench while loosening tube nuts at heat exchanger.
R (5)Remove airframe cooler outlet oil tube (LS03) as follows :
R (a)Remove three bolts (27) that attach tube flange to heat exchanger.
R (b)Remove lockwire and disconnect tube coupling nut from tube coupling.
Remove tube from heat exchanger.
(c)Discard packing (29). Install protective closures.
R (6)Disconnect the airframe cooler inlet oil tube (LS02) as follows.
R (a)Remove the three bolts (31) and washers (30) that attach the tube
R flange to the heat exchanger.
R (b)Loosen the clamp bolts and move the tube rearward. Remove the packing
R (28).
R (7)(Pre SB PW4ENG 79-60), remove the four outboard bolts (10) and washers
R (9), and loosen the four inboard bolts (10) as follows.
R (a)Remove the four outboard bolts (10) and washers (9) that attach the
R valve inlet collars to the rear of the intermediate case.
R (b)Use PWA 85853 Torque Adapter to loosen the four inboard bolts and
R washers that attach the valve inlet collars to the rear of the
R intermediate case. Do not remove the inboard bolts and washers from
R the intermediate case.
R NOTE : The four bolt holes in the valve inlet collars are slotted to
R make easier the removal of the exchanger and valve.
R (8)(Post SB PW4ENG 79-60), remove the four outboard bolt and washer
R assemblies, and loosen the four inboard bolt and washer assemblies from
R the valve inlet collars as follows.
R (a)Remove the four outboard bolt and washer assemblies that attach the
R valve inlet collars to the rear of the intermediate case.
R (b)Use PWA 85853 Torque Adapter to loosen the four inboard bolt and washer
R assemblies that attach the valve inlet collars to the rear of the
R intermediate case. Do not remove the inboard bolt and washer assemblies
R from the intermediate case.
R NOTE : The washers are captive (part of) of the washer and bolt
R assembly.

R (9)Remove two bolts (11) and washers (12) securing bracket (24) on forward side of valve to intermediate case.
R (10)Remove four bolts (14 and 15) securing lower bracket (13) to heat exchanger and to bracket (16) on intermediate case. Remove bracket (13)
R (11)Remove four bolts (5) and (7) securing upper bracket (6) to heat exchanger and to bracket (26) on intermediate case. Remove heat exchanger and valve from engine.
R (12)Install protective closures. Install a PWA87506 protective cover over
R the exchanger fins.

C. Installation (Ref. Fig. 401)

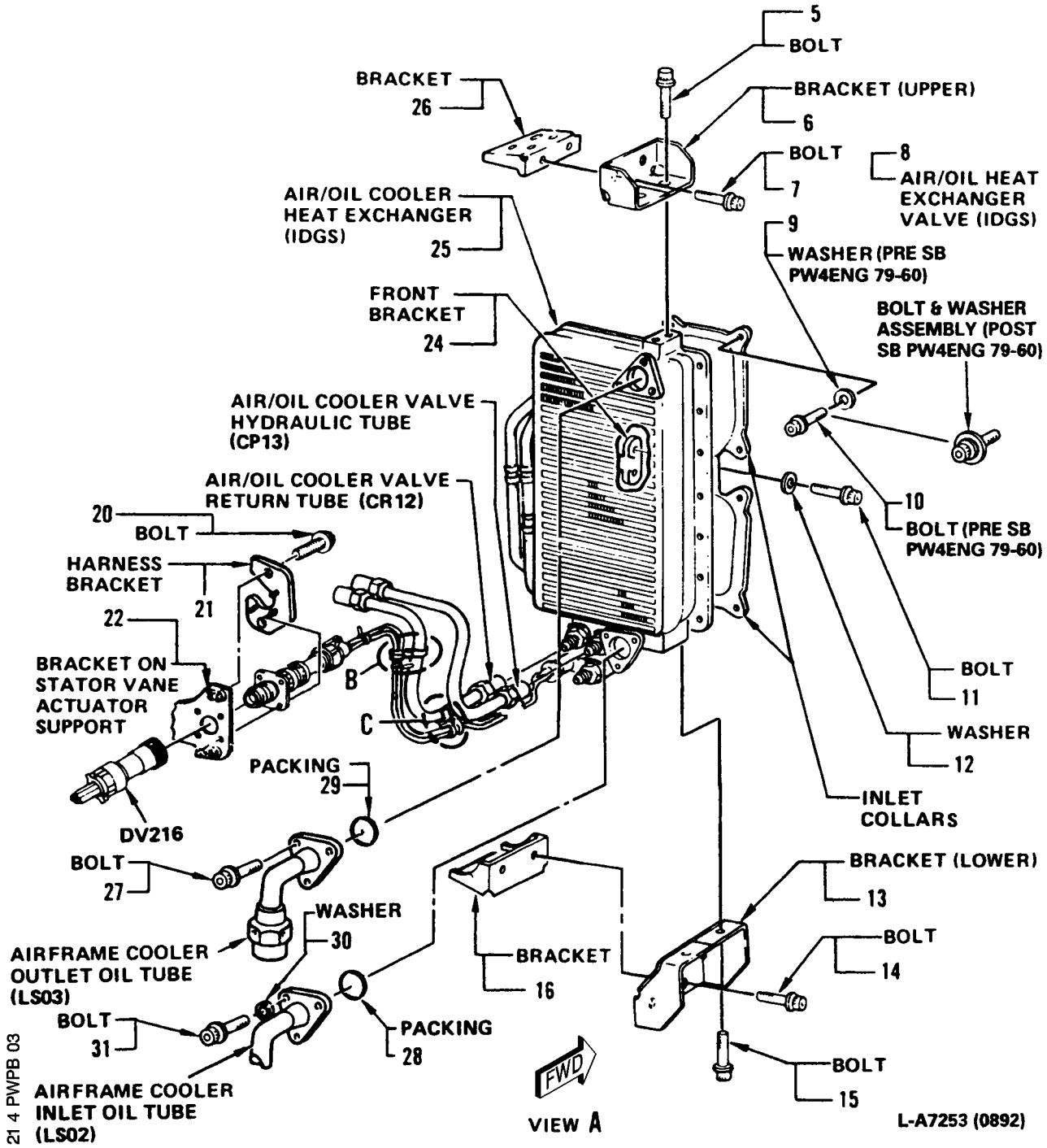
CAUTION : DO NOT HANDLE AIR/OIL HEAT EXCHANGER AND VALVE BY INLET COLLARS. INLET COLLARS ARE NOT INTEGRAL PARTS OF VALVE HOUSING.

(1)Remove protective closures.
R (2)(Pre SB PW4ENG 79-60), make sure the four inboard bolts (10) and washers
R (9) are installed loosely to the rear of the intermediate case as
R follows.
R (a)Make sure the four bolts (10), threads lubricated with Engine Oil
R (Material No.P03-001), and washers (9) are installed lossely in the
R four inboard bolt holes. Make sure the washers are sealed to the
R boltheads with Beeswax (Material No.P06-015).
R (3)(Post SB PW4ENG 79-60), make sure the four inboard bolt and washers
R assemblies are loosely installed in the rear of the intermediate case.
R (4)Set the bolt height with a PWA87505 positioner.
R (5)Install two packings to front of inlet collars lubricated with White
R Petrolatum (Material No. P06-002), if packings have not been previously
R installed.
R (6)Install and position air/oil heat exchanger (22) and valve in intermediate case, aligning inboard slotted holes in valve inlet collars with four bolts installed in intermediate case.

CAUTION : BE CERTAIN TO USE SHORTER BOLTS (SAME AS REMOVED) TO SECURE BRACKETS (UPPER AND LOWER) TO AIR/OIL HEAT EXCHANGER AND VALVE OR DAMAGE TO UNIT MAY RESULT.

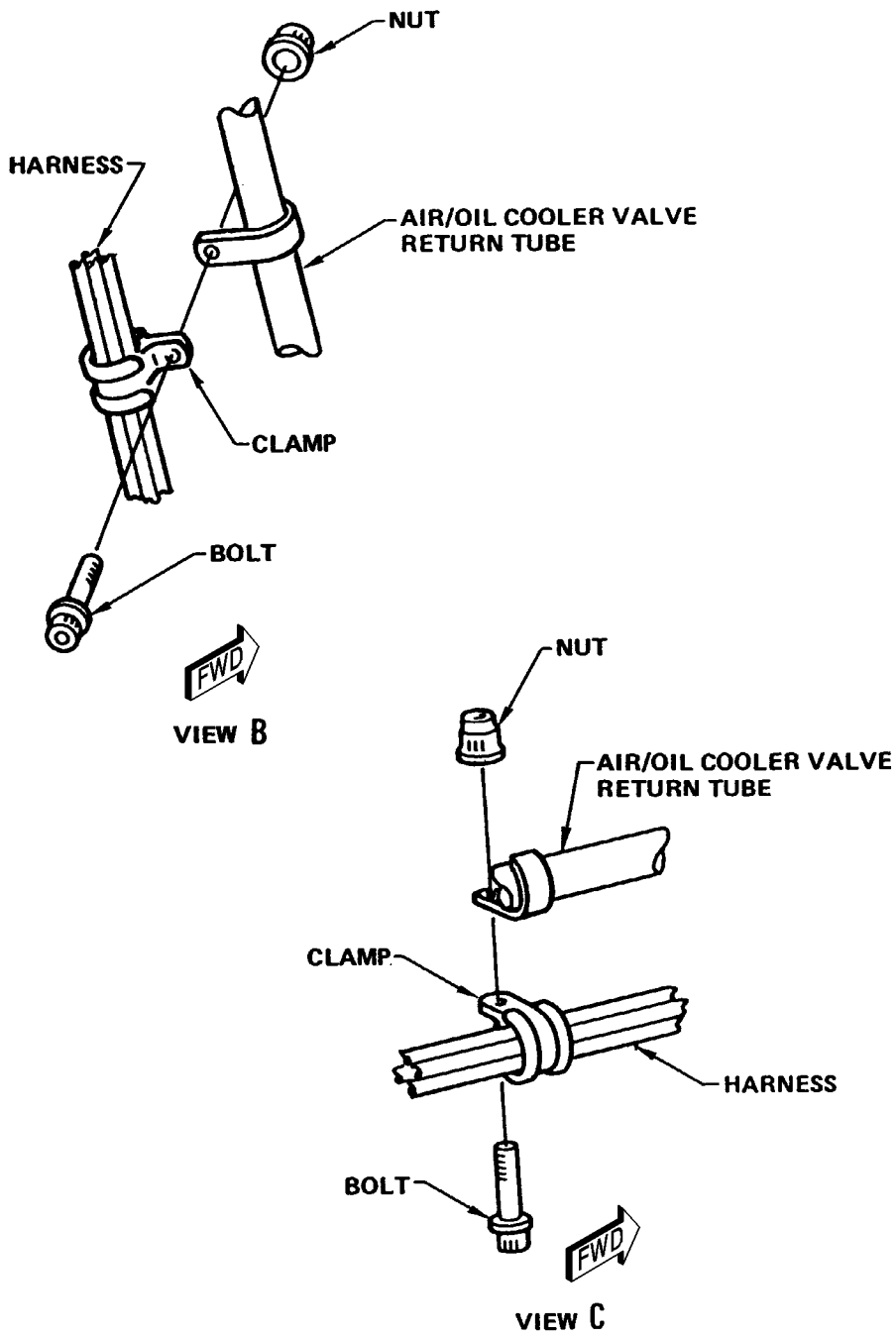
R (7)Secure upper bracket (6) to heat exchanger and to bracket (26) on
R intermediate case with four bolts (5) and (7), threads lubricated with
R Engine Oil (Material No.P03-001),handtight only.
R (8)Secure lower bracket (13) to heat exchanger and to bracket (16) attached
R to intermediate case with four bolts (14) and (15), threads lubricated
R with Engine Oil (Material No.P03-001), handtight only.
R (9)Secure bracket (24) on forward side of valve to intermediate case with
R two bolts (11), threads lubricated with Engine Oil (Material No.P03-001),
R and washers(12), handtight only.
R (10)Secure valve inlet collars to rear of intermediate case.
R Install four outboard bolts (10), threads lubricated with Engine Oil
R (Material No.P03-001), and washers (9) in outboard bolt holes. Tighten
R four previously installed inboard bolts and four outboard bolts handtight.

CAUTION : WITH THE PWA85853 TORQUE ADAPTER, ADJUST THE ACTUAL TORQUE WRENCH READING (Ref. 70-00-00, P. BLOCK 201). TOO MUCH TORQUE CAN DAMAGE THE THREADED PARTS.



IDG Air/Oil Heat Exchanger - Sheet 1/2
Figure 401

R



BM5 24 11 21 4 PWPM 02

IDG Air/Oil Heat Exchanger - Sheet 2/2
Figure 401

R

R (11)TORQUE previously installed bolts (5),(7),(14),(15),(11) and use the PWA85853 Torque Adapter to torque the four inboard bolts (10) to between 85 and 95 lbf.in (0.96 and 1.07 m.daN).
R (12)Connect the airframe cooler inlet oil tube (LS02) as follows.
R (a)Install packing (28), lubricated with Engine Oil (Material No.P03-001), to groove at the flange of the tube.
R (b)Install the tube to the heat exhanger and attach with three washers (30) and three bolts (31) lubricated with Engine Oil (Material No.P03-001).
R (c)TORQUE the bolts to 70lbf.in. (0.79 m.daN).
R (d)Tighten and TORQUE the clamp bolts to between 36 and 40 lbf.in. (0.4 and 0.45 m.daN).
R (13)Install airframe cooler outlet oil tube (LS03) as follows.
(a)Remove protective closures.
R (b)Install packing (29), lubricated with Engine Oil (Material No.P03-001), into groove on flange end of tube.
R (c)Install tube to heat exchanger with three bolts (27), threads lubricated with Engine Oil (Material No.P03-001). Tighten bolts handtight.
R (d)Lubricate tube coupling threads with Antigalling Compound (Material No.P06-003) and connect tube nut to tube coupling. Tighten nut handtight.
R (e)TORQUE three previously installed bolts (27) to between 85 and 95 lbf.in. (0.96 and 1.07 m.daN).
R (f)TORQUE tube nut to between 675 and 750 lbf.in. (7.62 and 8.47 m.daN). Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292) nut.
R CAUTION : MAKE SURE YOU INSTALL THE TUBE TO THE CORRECT CONNECTOR OR FAULT MESSAGES WILL BE GENERATED.
R (14)Connect air/oil cooler valve return tube (CR12) as follows.
R (a)Lubricate tube nut threads with Antigalling Compound (Material No.P06-003). Connect the tube to heat exchanger adapter that is closest to the lower triangular pad.
R (b)TORQUE tube nut to between 140 and 160 lbf.in. (1.58 and 1.8 m.daN) Secure with Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292).
NOTE : Hold bulkhead adapter with wrench while tightening tube nut at heat exchanger.
R CAUTION : MAKE SURE YOU INSTALL THE TUBE TO THE CORRECT CONNECTOR OR FAULT MESSAGES WILL BE GENERATED.
R (15)Connect air/oil cooler valve hydraulic tube (CP13) as follows.
R (a)Lubricate tube nut threads with Antigalling Compound (Material No.P06-003). Connect the tube to heat exchanger adapter that is closest to the lower triangular pad.
R (b)TORQUE tube nut at heat exchanger to between 140 and 160 lbf.in. (1.58 and 1.8 m.daN). Secure with Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292).
NOTE : Hold bulkhead adapter with wrench while tightening tube nut at heat exchanger.
R (16)Remove protective closure. Install valve cable receptacle to bracket on

stator vane actuator support (22), aligning holes in connector flange with holes in bracket. Secure receptacle with two bolts (20), threads lubricated with Engine Oil (Material No.P03-001) and harness bracket (21).
Torque bolts to between 36 and 40 lbf.in. (0.40 and 0.45 m.daN).

R (17)Install clamps, bolts, threads lubricated with Engine Oil (Material
R No.P03-001), and nuts securing harness to air/oil cooler valve return
R tube (17).
TORQUE bolts to between 36 and 40 lbf.in. (0.4 and 0.45 m.daN).
R CAUTION : USE THE CORRECT ASSEMBLY PROCEDURE AND TOOLS FOR THE HARNESS
R CONNECTOR INSTALLATION (REF. 70-00-00, P. BLOCK 201). IF YOU
R USE THE INCORRECT ASSEMBLY PROCEDURE OR TOOLS, A DAMAGED OR
R LOOSE CONNECTOR CAN OCCUR. A LOOSE CONNECTOR PERMITS
R VIBRATION, WHICH CAN CAUSE THE CONTACTS TO WEAR AND
R UNSATISFACTORY LIGHTNING PROTECTION.
R (18)Remove the protection cover and connect the DV216 connector to the
R receptacle attached to bracket (22). (Ref. 70-00-00, P. Block 201).

R D. Postrequisites
R (1)Install the fan exit liner segment (inner rear) that you removed
R (Ref. 72-23-05, P. Block 401).
R (2)Test engine per Test Reference Table (Ref. 71-00-00, P. Block 501).

R E. Close-Up
(1)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).
R (2)On the appropriate FIRE control module, push the fire handle and remove
R the warning notice.
R (3)Remove safety clips and tags and close circuit breakers. Close right
R thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

R F. Test
(1)Check IDG oil system for leakage at first engine start up (Ref. 24-11-00, P. Block 601).
(2)Check oil level in IDG (Ref. 24-11-00, P.Block 601) and top up if necessary (Ref. 12-13-24, P. Block 1).

OIL LEVEL INDICATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container 2 US Gallons
C.	Lockwire
D.	Torque Wrench
E.	O-Ring
F. Material No. 03-002	Oil (Ref. 20-31-00)
G. Material No. 04-008	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR.
IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

CAUTION : ALLOW IDG TO COOL BEFORE VENTING OR ATTACHING DRAIN LINE.
IF IDG IS NOT COOL, OIL WILL BE HOT AND UNDER PRESSURE.

(1)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(2)Drain off IDG (Ref. 12-13-24, P. Block 1).

B. Removal

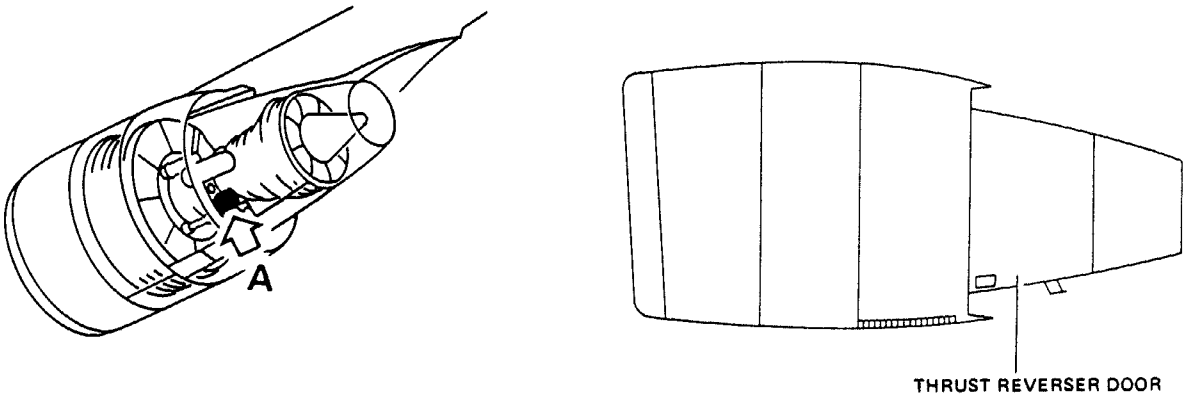
(Ref. Fig. 401)
(1)Remove screws and washers.
(2)Remove oil level indicator and discard O-ring.

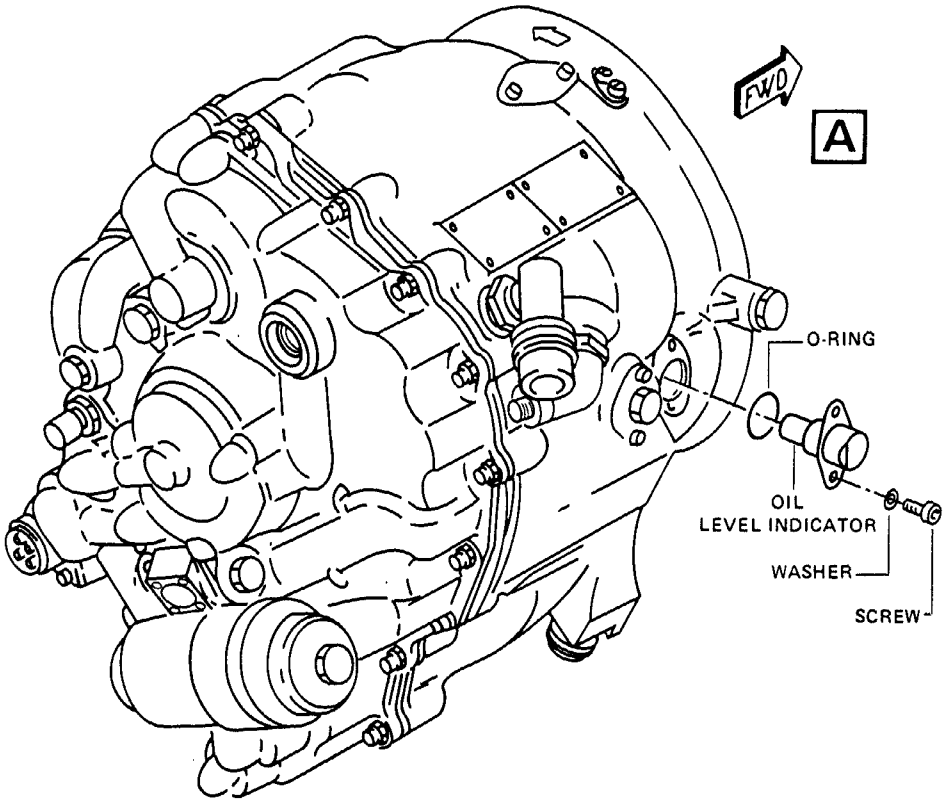
C. Installation

(1)Install new O-ring Lubricated with Material No. 04-008 or with Material No. 03-002 on oil level indicator.
(2)Install oil level indicator, washers and screws on IDG.
(3)TORQUE screws to between 51 and 56 lbf.in. (0.576 and 0.633 m.daN).

D. Close-Up

(1)Fill IDG with oil (Ref. 12-13-24, P. Block 1).
(2)Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).





BM5 24 11 23 4 PWPO-23

IDG - Oil Level Indicator
Figure 401

OIL LEVEL INDICATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container 2 US Gallons
C.	Lockwire
D.	Torque Wrench
E.	O-Ring
F. Material No. 03-002	Oil (Ref. 20-31-00)
G. Material No. 04-008	Common Greases (Ref. 20-31-00)
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. WEAR SPLASH GOGGLES, INSULATED GLOVES, AND OTHER PROTECTIVE GEAR.
IN CASE OF EYE OR SKIN CONTACT, GET MEDICAL ATTENTION IMMEDIATELY.

CAUTION : ALLOW IDG TO COOL BEFORE VENTING OR ATTACHING DRAIN LINE.
IF IDG IS NOT COOL, OIL WILL BE HOT AND UNDER PRESSURE.

(1)Open right fan cowl door (Ref. 71-13-00, P. Block 301).
(2)Drain off IDG (Ref. 12-13-24, P. Block 1).

B. Removal

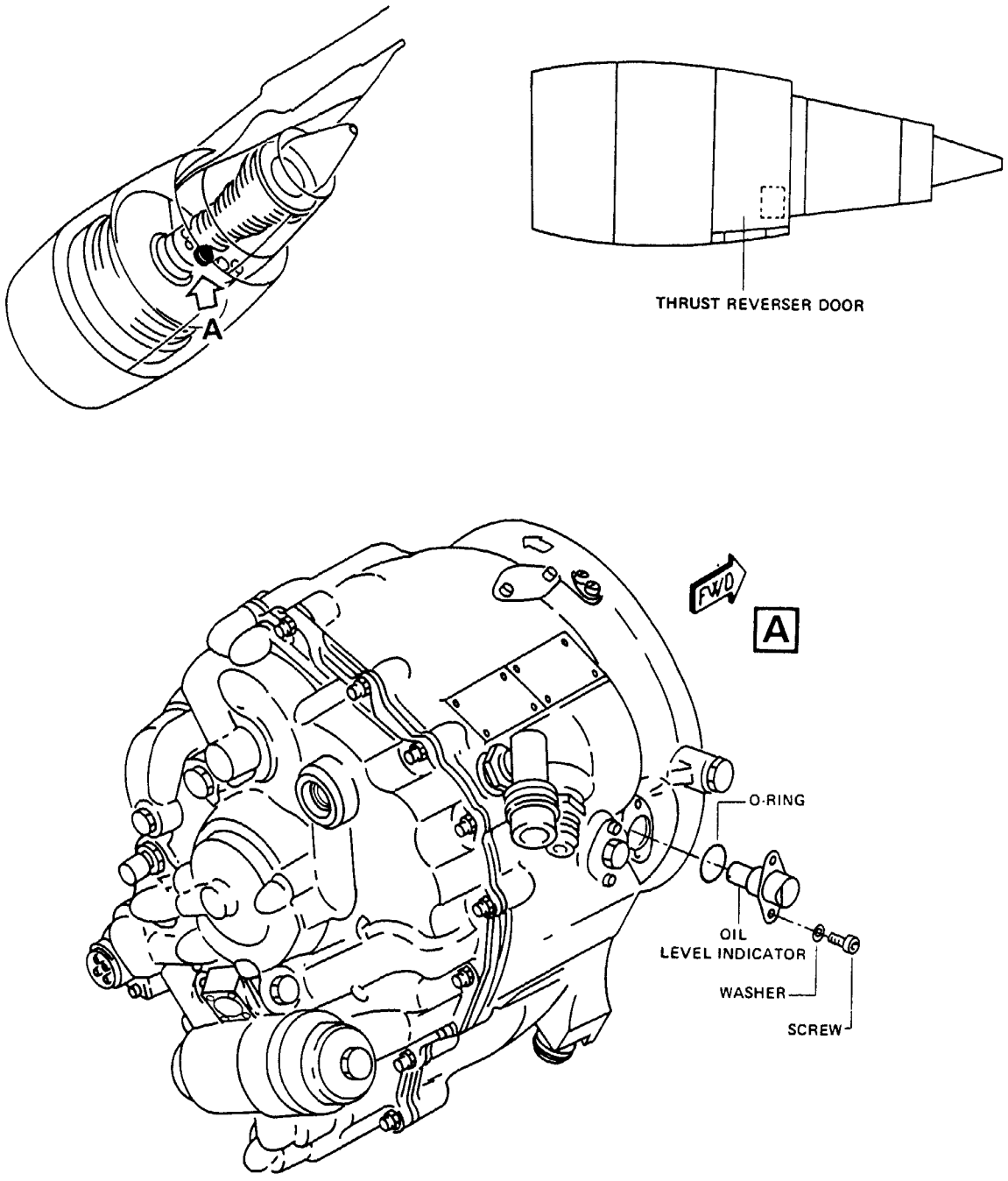
(Ref. Fig. 401)
(1)Remove screws and washers.
(2)Remove oil level indicator and discard O-ring.

C. Installation

(1)Install new O-ring Lubricated with Material No. 04-008 or with Material No. 03-002 on oil level indicator.
(2)Install oil level indicator, washers and screws on IDG.
(3)TORQUE screws to between 51 and 56 lbf.in. (0.576 and 0.633 m.daN).

D. Close-Up

(1)Fill IDG with oil (Ref. 12-13-24, P. Block 1).
(2)Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).



BM5 24 11 23 4 TGAO 13 07
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IDG - Oil Level Indicator
Figure 401

HEAT EXCHANGER VALVE (IDG) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench : 50-300 lbf.in. (0.56 - 3.34 m.daN)
C. Material No.C02-019	Anti Seize Compounds, Lubricants, Oils (Ref. 70-00-00)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY

(1)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG 1	3XT	206/D20
22VU	ELEC/DISC/IDG 2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, R fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Removal

(Ref. Fig. 401)

(1)Disconnect electrical connector and install protective cover.

(2)Disconnect 11th stage tube from reducer fitting in valve.

(3)Lock valve butterfly in closed position to protect sealing edge as follows :

(a)Remove set screw and lock screw from storage holes.

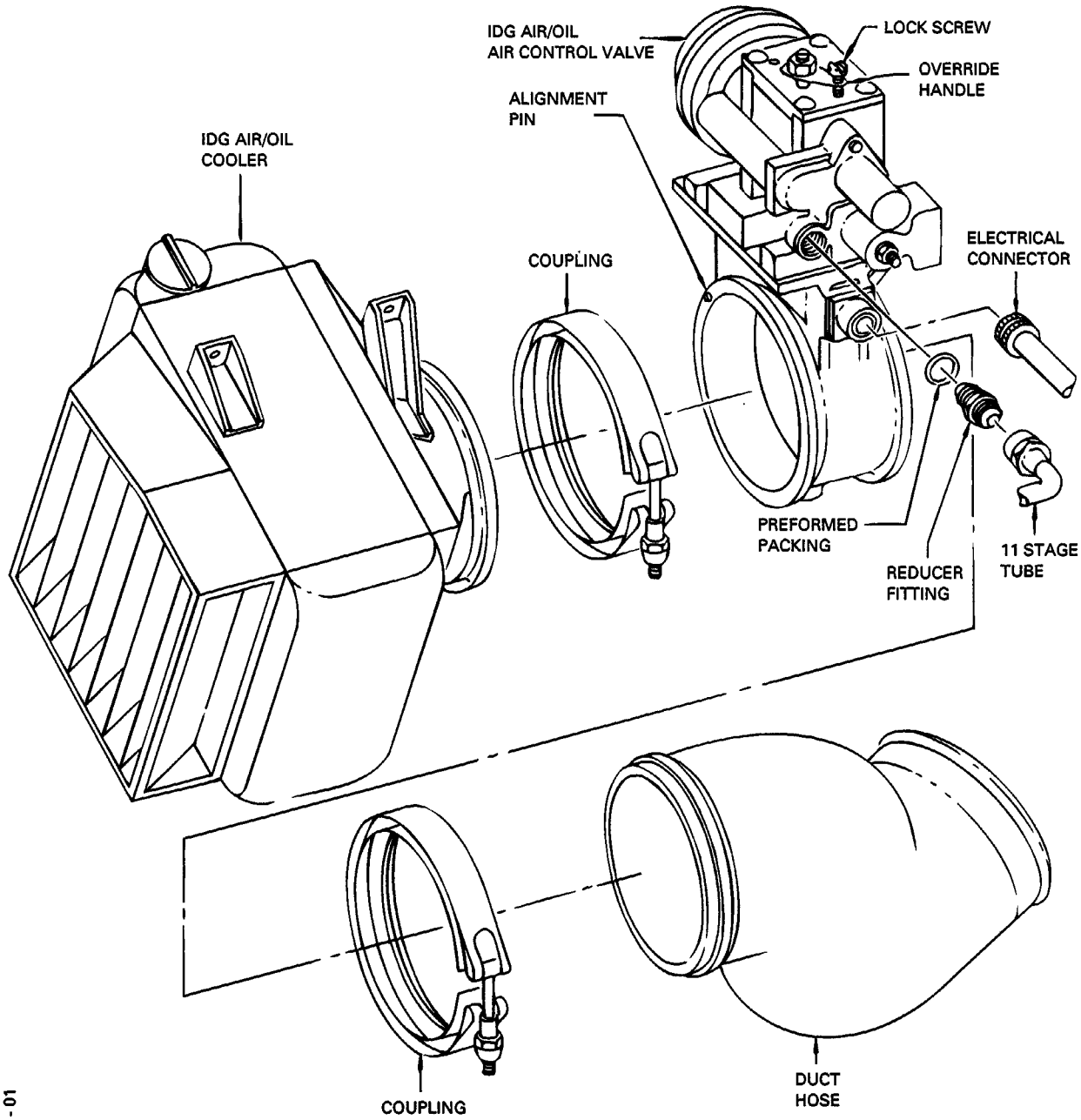
(b)Rotate override handle to closed position and secure by inserting lock screw down through hole in override handle and into set screw storage hole in shaft retaining plate. Hand tighten lock screw.

(4)Remove couplings attaching valve to duct hose and IDG air/oil cooler and remove valve.

(5)Remove reducer fitting and preformed packing from valve. Discard packing.

(6)Install protective covers on electrical connector, 11th stage tube port, duct hose and IDG air/oil cooler.

C. Installation (Ref. Fig. 401)



IDG Heat Exchanger Valve.
Figure 401

(1)Lock valve butterfly in closed position to protect sealing edge as follows :
  (a)Remove set screw and lock screw from storage holes.
  (b)Rotate override handle to closed position and secure by inserting lock screw down through hole in override handle and into set screw storage hole in shaft retaining plate. Hand tighten lock screw.
(2)Remove protective covers from 11th stage tube port, duct hose, oil cooler, and electrical connector.
(3)Lightly coat new preformed packing with Material No.C02-019 and install on reducer fitting. Install reducer fitting in 11th stage tube port and TORQUE to between 155 and 175 lbf.in. (1.25 and 1.98 m.daN).
  CAUTION : THE VALVE HAS AN ALIGNMENT PIN TO MAKE SURE ALIGNMENT BETWEEN THE VALVE AND HEAT EXCHANGER FLANGES IS CORRECT. BE SURE THAT THE VALVE ALIGNMENT PIN IS ENGAGED IN THE ALIGNMENT HOLE IN THE HEAT EXCHANGER FLANGE BEFORE YOU TIGHTEN THE CLAMP. YOU MAY DAMAGE THE VALVE IF THE ALIGNMENT PIN IS NOT CORRECTLY ENGAGED IN THE ALIGNMENT HOLE.
(4)Position valve between duct hose and air/oil cooler.
  (a)Engage alignment pin on valve flange in hole on air oil cooler.
(5)Install couplings on each end of valve and TORQUE to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).
(6)Return valve butterfly to open position as follows :
  (a)Remove lock screw from override handle and allow to return to open position.
  (b)Install lock screw and set screw in storage holes and hand tighten.
(7)Connect 11th stage tube to reducer fitting in valve and TORQUE coupling to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).
(8)Connect electrical connector to valve. Tighten connector fingertight plus one-eighth turn.
  NOTE : GE engines do not require a functional test of IDG air/oil cooling valve after installation.

D. Close-Up
(1)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers 1XT, 2XT, 3XT, 4XT, 15XU and 18XU.

AIR/OIL HEAT EXCHANGER VALVE (IDG) - REMOVAL/INSTALLATION

1. Equipment and Materials

	ITEM	DESIGNATION
R	(1)	Bergen Mechanical Crimper (Optional) Model
R		M303, M305,M307
	A.	Circuit Breaker Safety Clips
	B.	Packings
	C.	Corrosion Resistant Steel Lockwire
	D.	Torque Wrench
	E. Material No.P03-001	Oil, Engine
R	F. Material No.P05-289	Lockwire (AS3214-02)
R	G. Material No.P05-291	Cable, Safety (Optional)
R	H. Material No.P05-292	Ferrule, Safety Cable (Optional)
R	J. Material No.P06-002	Lubricants (Ref. 70-00-00)
R	K. Material No.P06-003	Lubricants (Ref. 70-00-00)
	Referenced Procedures	
	- 24-11-21, P. Block 401	Air/Oil Heat Exchanger (IDG)
	- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

R	PANEL	SERVICE	IDENT.	LOCATION
R	22VU	ELEC/DISC/IDG1	3XT	206/D20
R	22VU	ELEC/DISC/IDG2	4XT	206/D21
	133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
	133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
	133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
	133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(2)Open, safety and tag circuit breakers for the appropriate engine and
R open right thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

R B. Removal (Ref. Fig. 401, 402, 404)
R (Ref. Fig. 403, 405, 406)

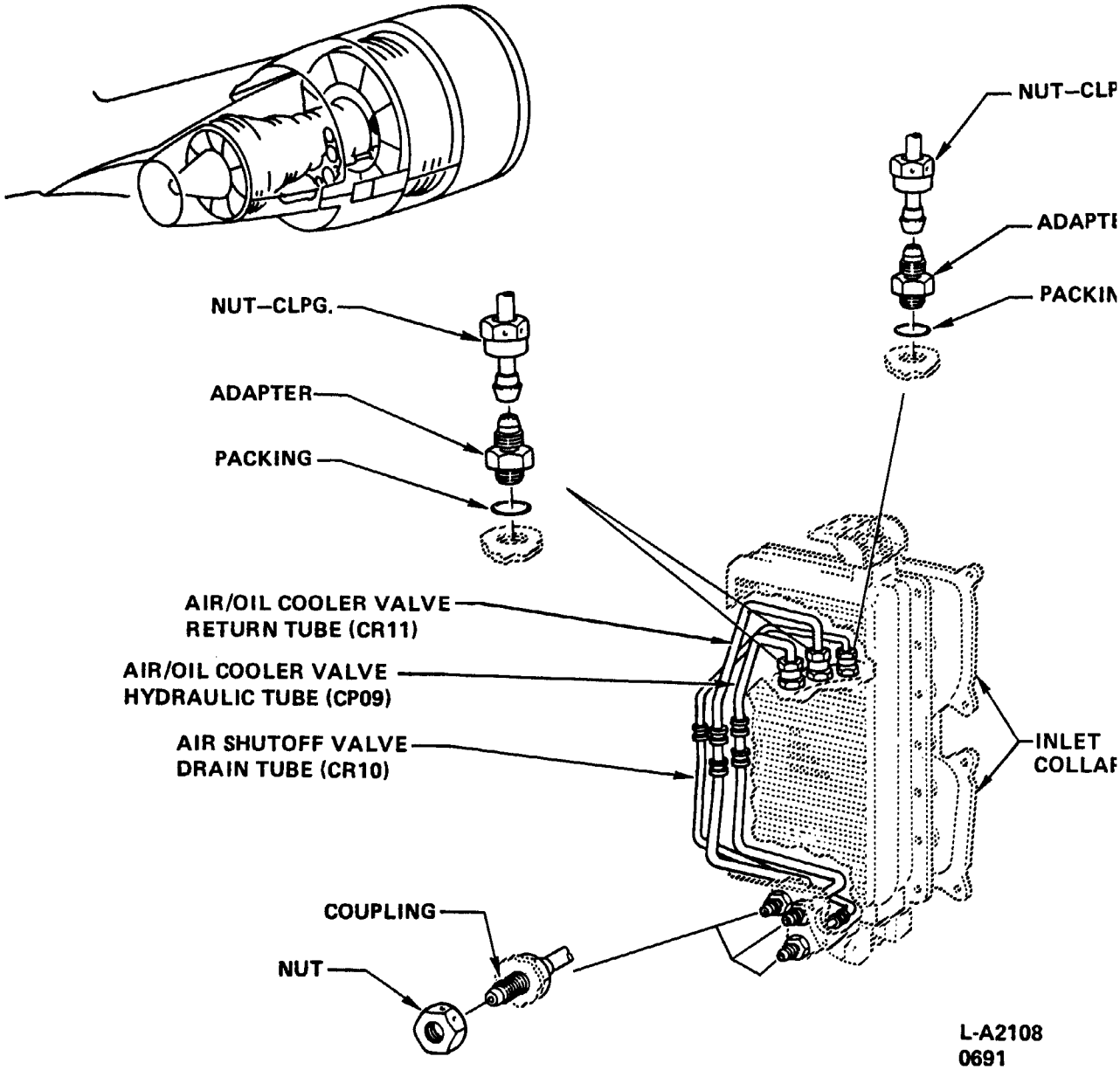
CAUTION : DO NOT LIFT THE HEAT EXCHANGER VALVE AND HEAT EXCHANGER BY THE INLET COLLARS. THE INLET COLLARS ARE NOT AN INTEGRAL PART OF THE VALVE HOUSING.

(1)Remove Air/Oil heat exchanger and valve (IDGS) from engine (Ref. 24-11-21, P. Block 401).

(2)Place air/oil heat exchanger and valve on bench.

R (3)(Pre SB PW4ENG 79-49). Remove the lockwire and jamnuts which secure the
R three tubes to the flange on the heat exchanger.

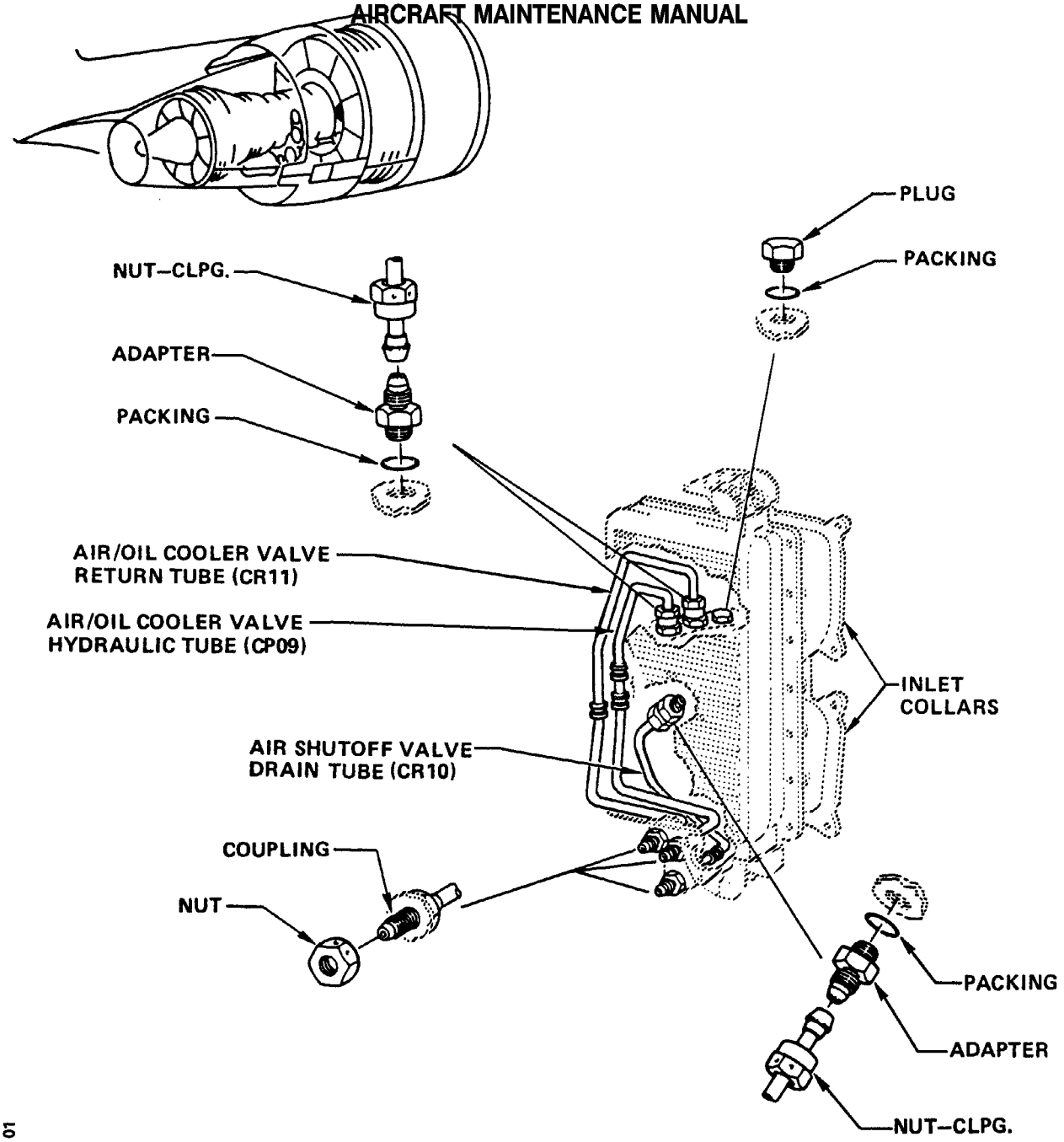
R (4)(Post SB PW4ENG 79-49). Remove the lockwire, jamnuts, washers and plate
R which secure the three tubes to the flange on the exchanger.



BM5 24 11 24 4 PWPA - 01

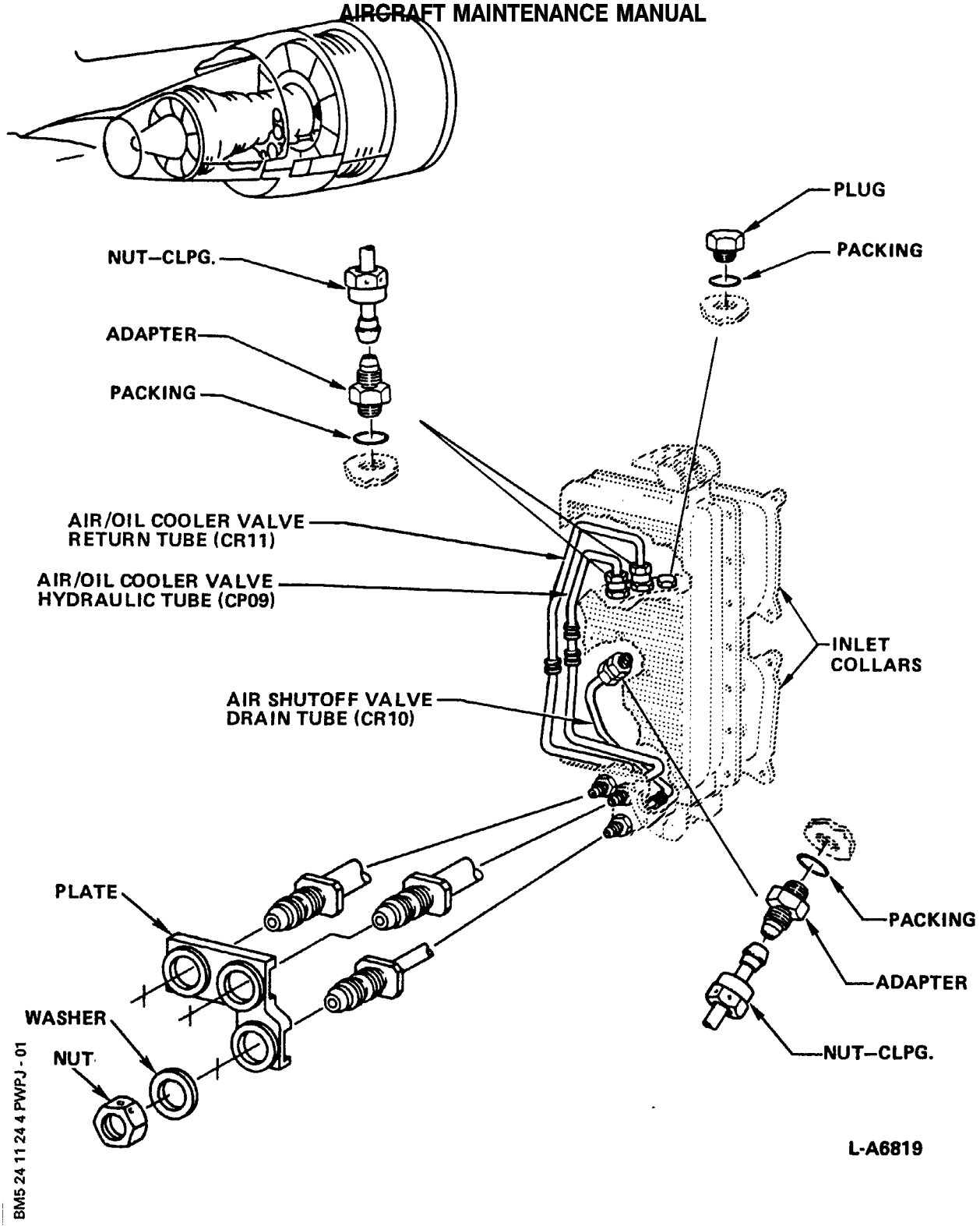
IDG Heat Exchanger Valve - Sheet 1/3 (PRE SB PW4ENG 24-4)

R Figure 401



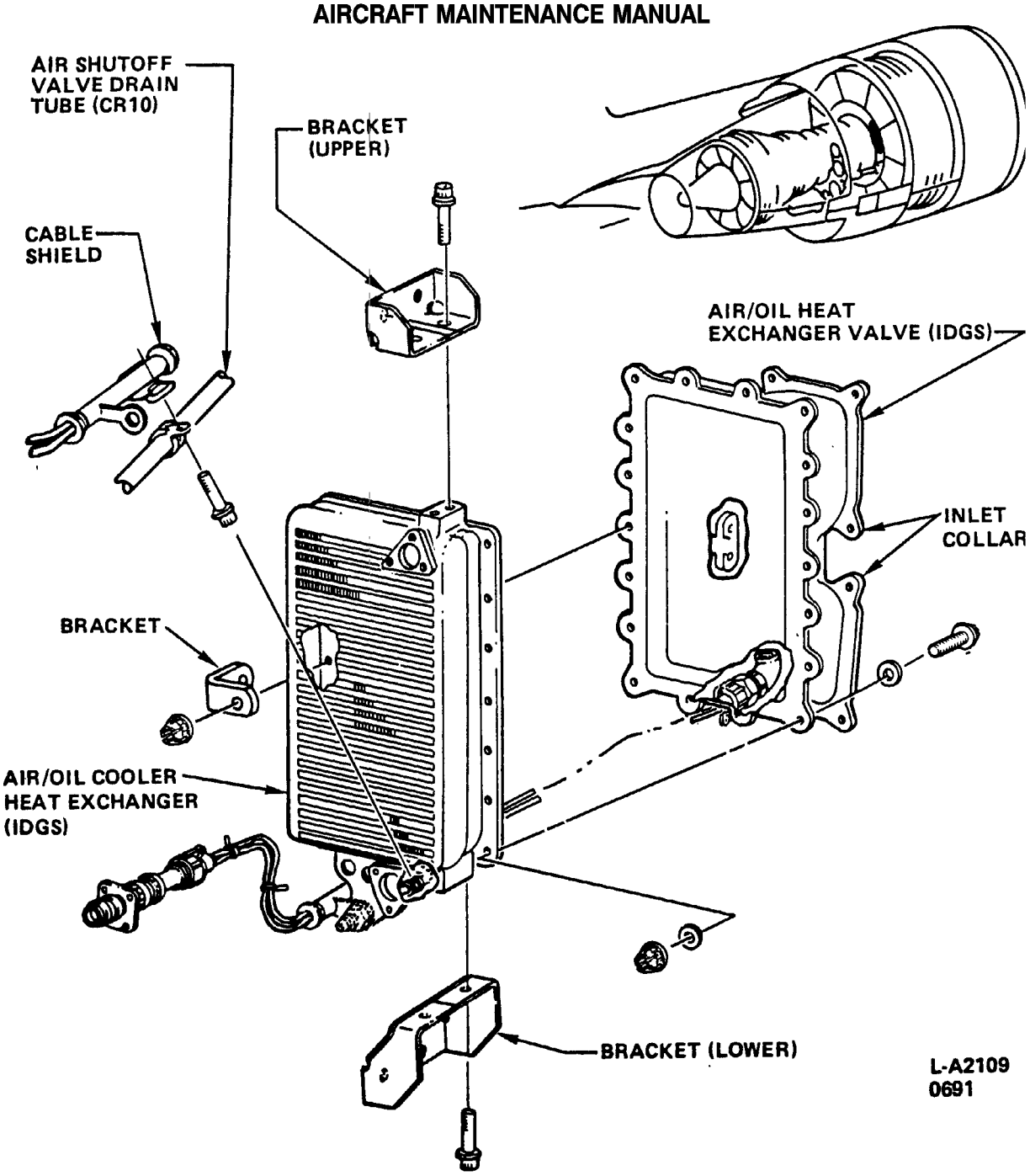
IDG Heat Exchanger Valve - Sheet 2/3 (POST SB PW4ENG 24-4)
(PRE SB PW4ENG 79-49)
Figure 401

R



IDG Heat Exchanger Valve - Sheet 3/3
(POST SB PW4ENG 79-49)
Figure 401

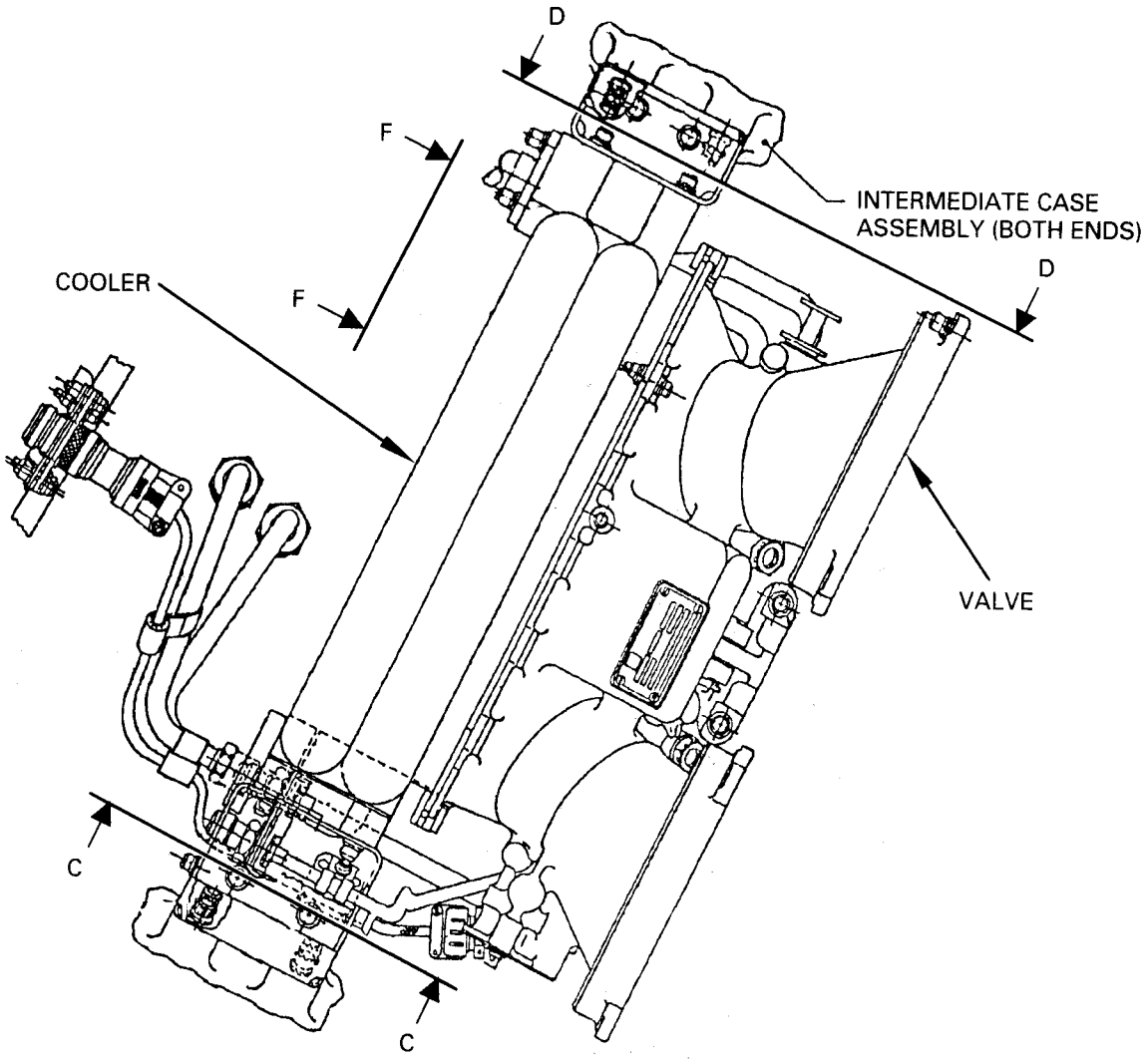
R



BM5 24 11 24 4 PWRO - 00

IDG Heat Exchanger Valve
Figure 402

R



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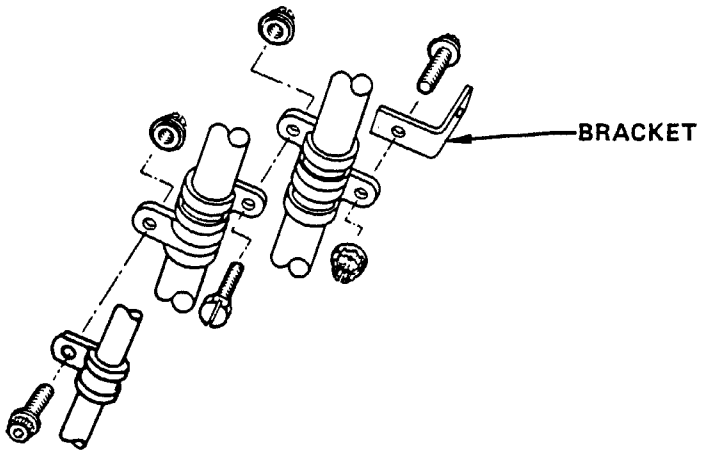
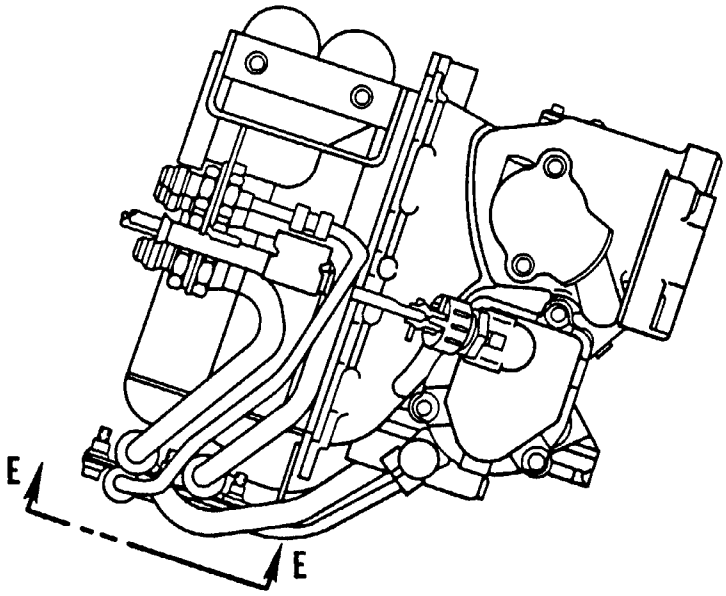
L-B3797 (0000)

Air/Oil Heat Exchanger and Valve
Figure 403

R



VIEW E–E



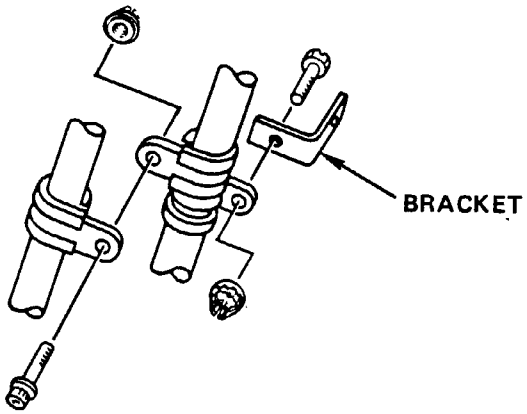
SECTION C–C

L-A0739
0691

BM5 24 11 24 4 PWTA - 00

IDG Heat Exchanger Valve - Sheet 1/2
(PRE SB PW4ENG 79-49)
Figure 404

R



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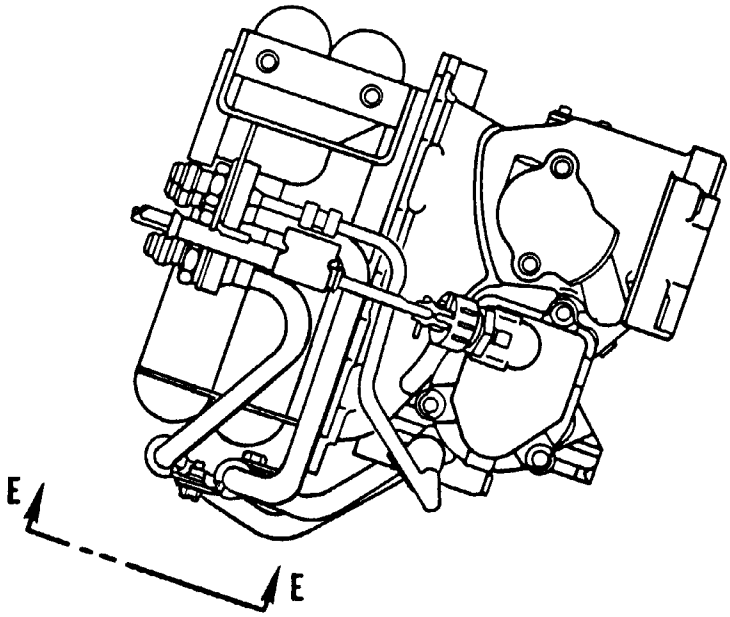


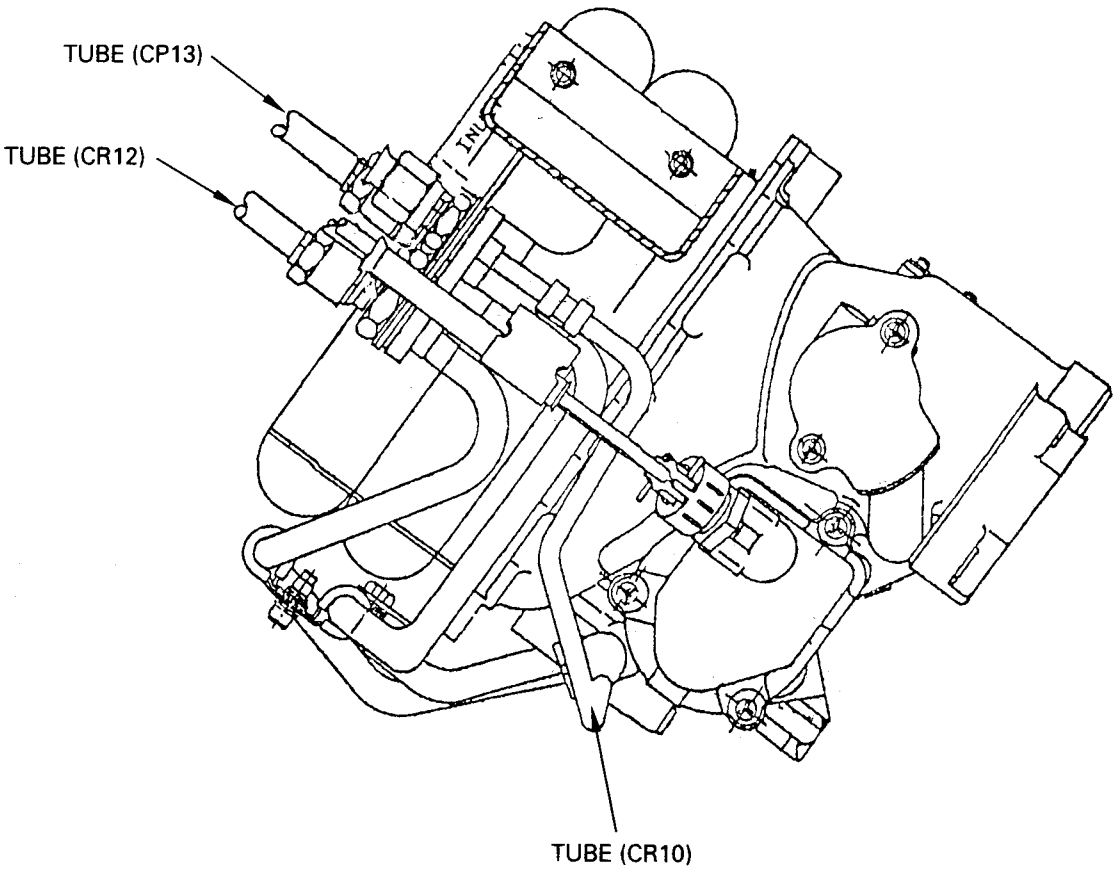
SECTION C-C

L-A5776
0691

BM5 24 11 24 4 PWTJ - 00

IDG Heat Exchanger Valve - Sheet 2/2
(POST SB PW4ENG 79-49)
Figure 404

R



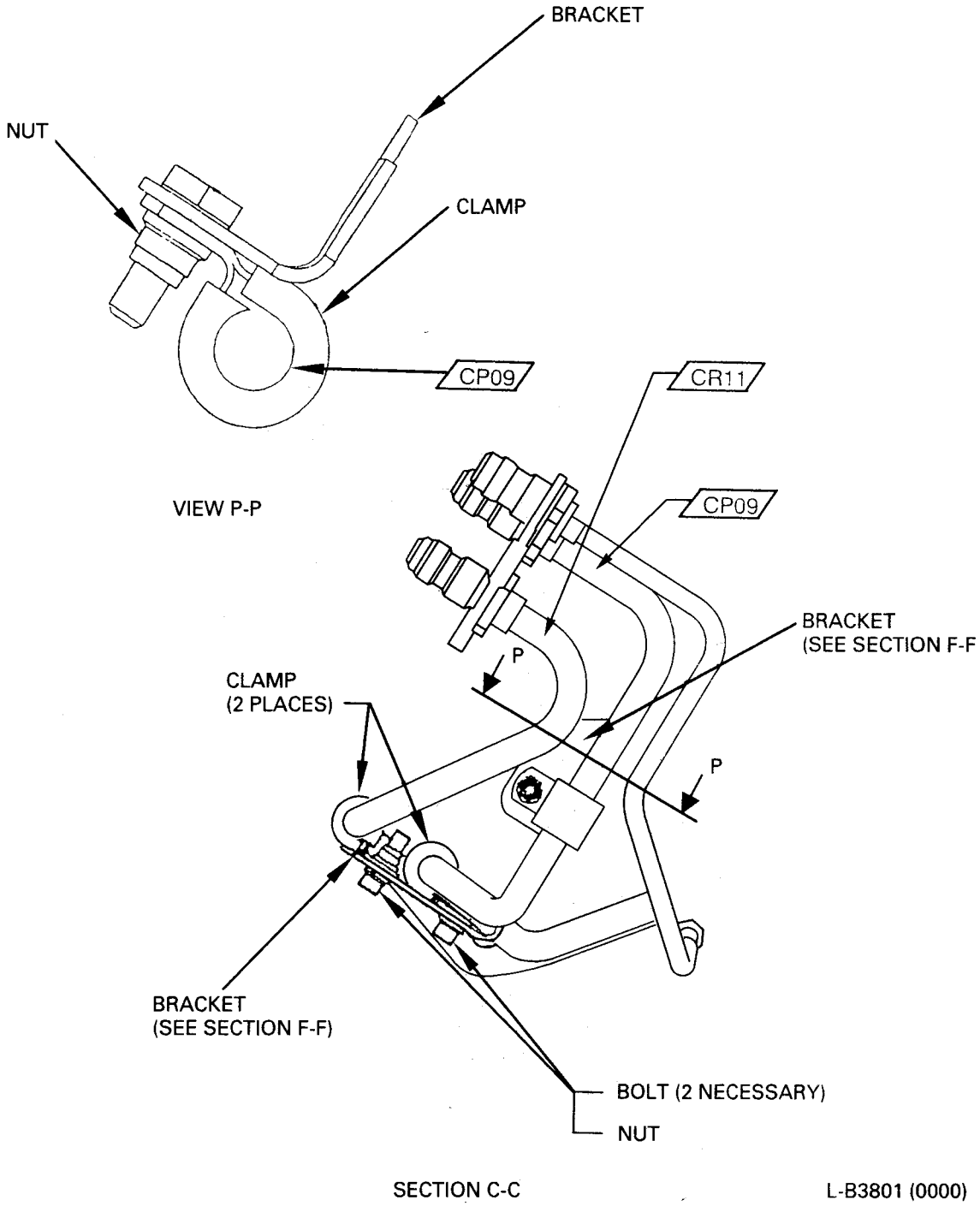
SECTION C-C

L-B3798 (0000)

BM5 24 11 24 4 PWUA 00

Air/Oil Heat Exchanger and Valve (post SB PW4ENG 79-49)
(pre SB PW4ENG 24-7)
Figure 405

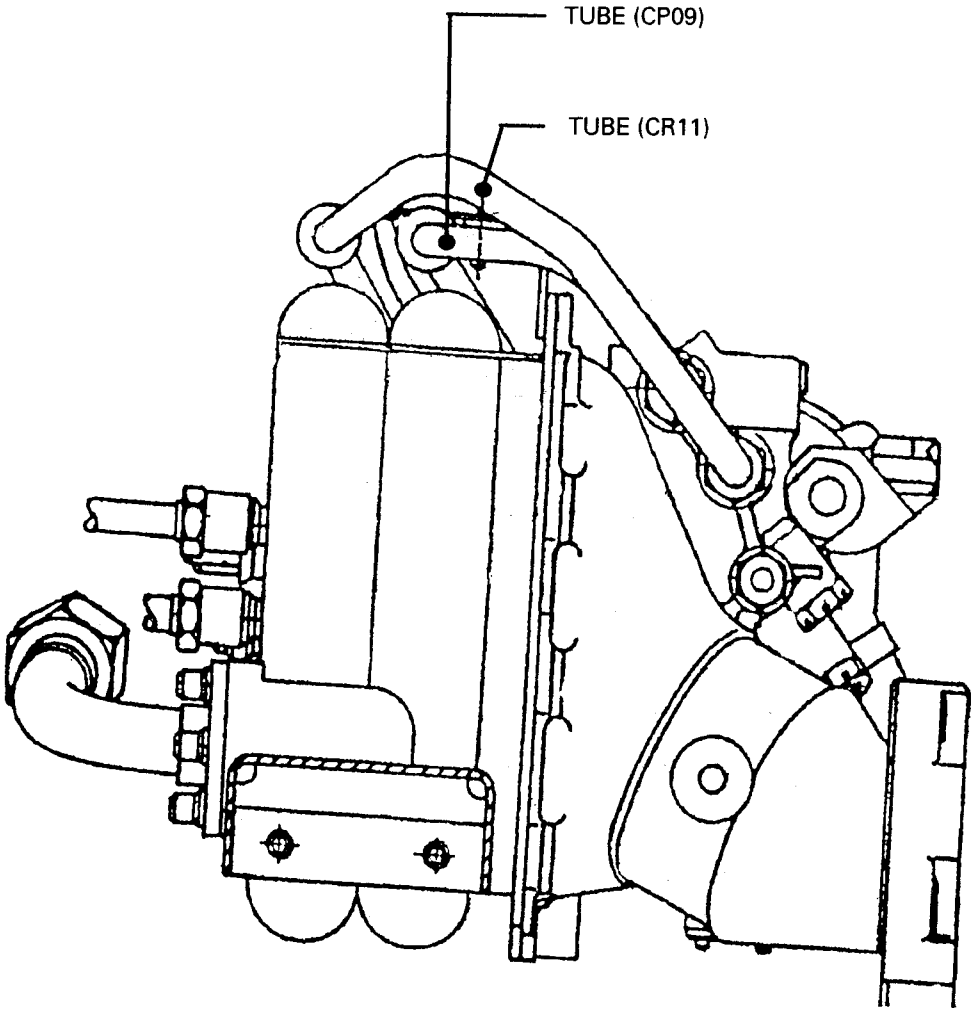
R



BM5 24 11 24 4 PWUE 00

Air/Oil Heat Exchanger and Valve (post SB PW4ENG 24-4)
(pre SB PW4ENG 24-9)
Figure 405

R



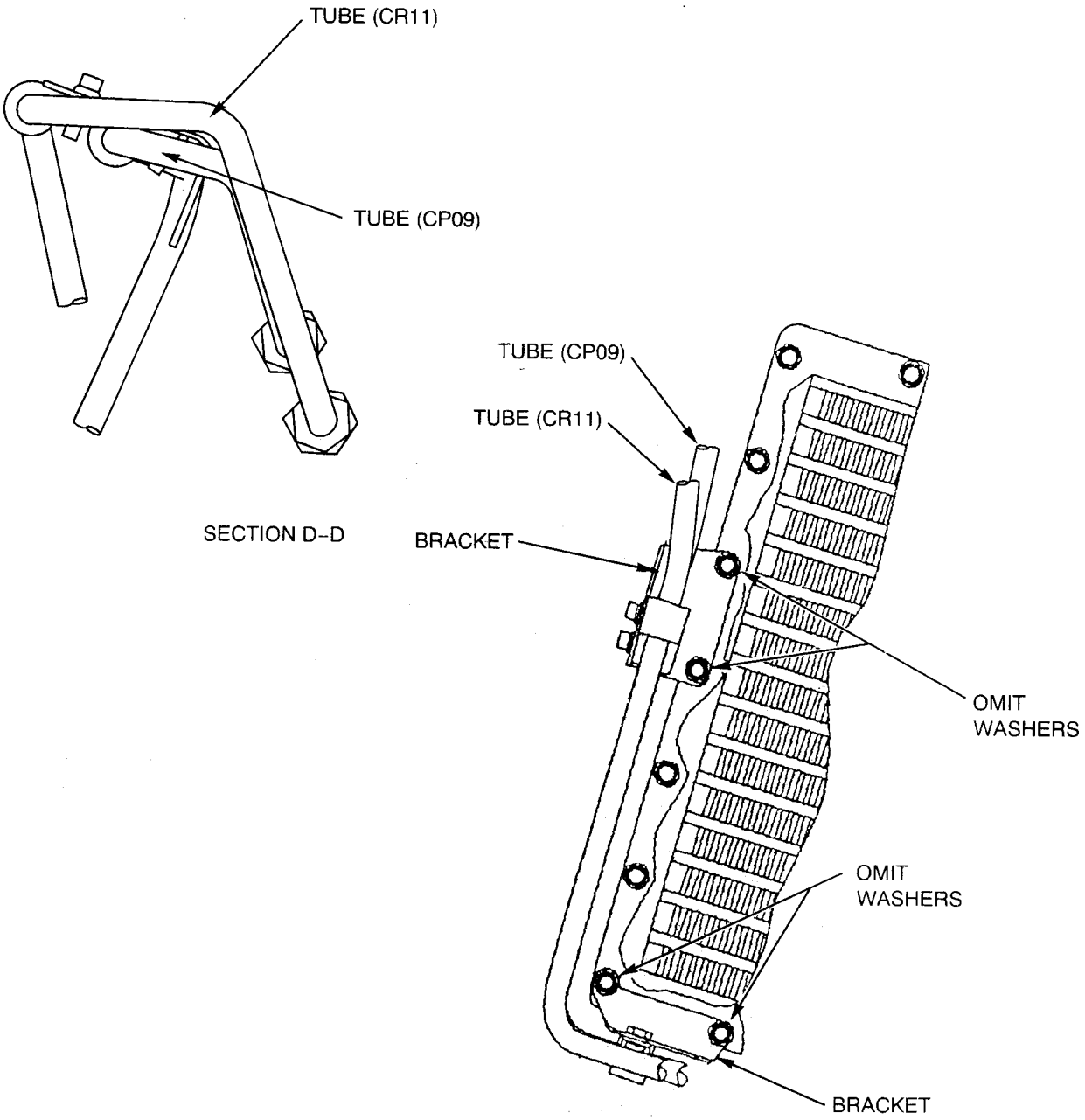
SECTION D-D

L-B3799 (0000)

BM5 24 11 24 4 PWUJ 00

Air/Oil Heat Exchanger and Valve (post SB PW4ENG 79-49)
(pre SB PW4ENG 24-7)
Figure 405

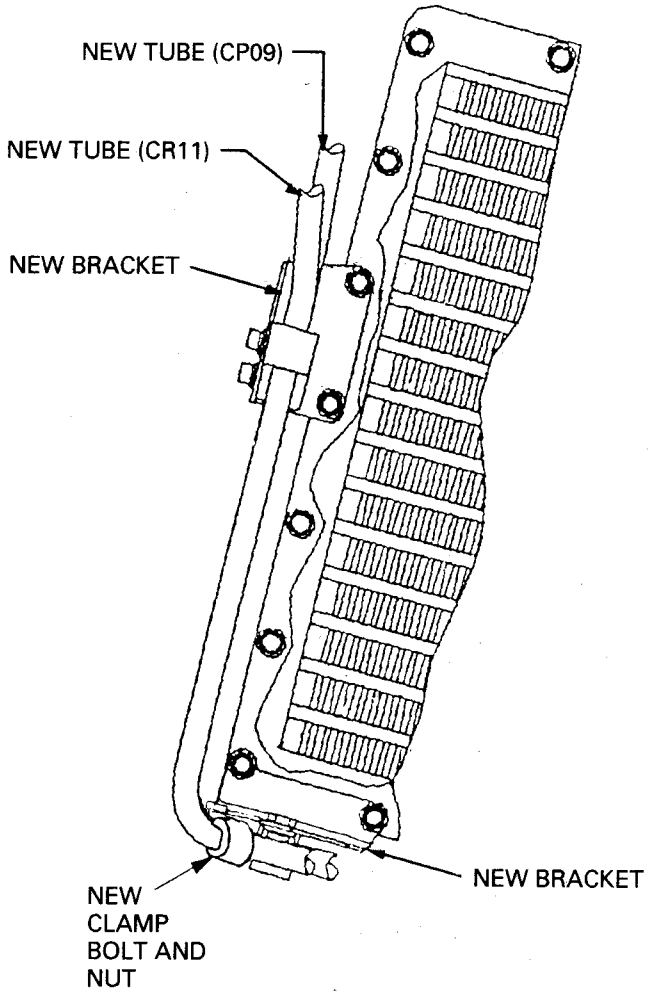
R



BM5 24 11 24 4 PWVA 00

Air/Oil Heat Exchanger and Valve (post SB PW4ENG 24-7)
(pre SB PW4ENG 24-9)
Figure 406

R



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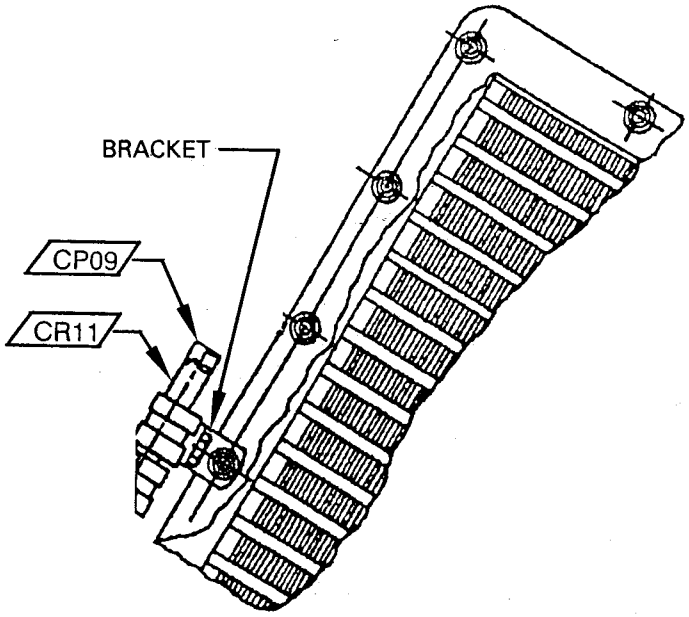
BM5 24 11 24 4 PWVE 00

Air/Oil Heat Exchanger and Valve (post SB PW4ENG 24-9)
Figure 406

R



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Air/Oil Heat Exchanger and Valve (post SB PW4ENG 79-49)
(pre SB PW4ENG 24-7)
Figure 406

R

R (5)Remove the bolt which secures the tube clamp to the cable shield. Remove the clamp.
R (6)Remove the bolts, nuts and washers from the valve and heat exchanger mating flange.
R (7)Separate the valve from the heat exchanger.
R (8)If a new valve is to be installed, comply with the following :
R (a)Disconnect and remove the three tubes from the adapters.
R (b)Remove the three adapters from the valve ports and discard packings. Install the protective closures.
R (c)(Post SB PW4ENG 24-4). Remove the plug from the end of the valve and discard the packing.
R (9)If a new heat exchanger is to be installed, comply with the following :
R (a)Remove the bolts which secure the lower and upper mount brackets to the heat exchanger. Remove the brackets.

R C. Installation (Ref. Fig. 401, 402, 404)
R (Ref. Fig. 403, 405, 406)
R (1)Place the air/oil heat exchanger valve, on bench with the two four hole ducts downward and three end ports facing operator.
R (2)Place the air/oil heat exchanger on the valve with the three hole tube flange toward operator.
R (3)Secure the heat exchanger and drain tube bracket to the valve with bolts, threads lubricated with Engine Oil (Material No.P03-001), washers (under bolt heads and nuts), and nuts. Omit a washer at the bracket location. TORQUE nuts to between 36 and 40 lbf.in. (0.4 and 0.45 m.daN).
R (4)If a new valve is to be installed, comply with the following :
R (a)(Pre SB PW4ENG 24-4). Install packing, lubricated with White Petrolatum (Material No.P06-002), on the smaller adapter. Lubricate the adapter threads with Engine Oil (Material No.P03-001), and install adapter in the smaller port of the three ports at the end of the valve. TORQUE the adapter to between 65 and 75 lbf.in. (0.73 and 0.84 m.daN).
R (b)(Post SB PW4ENG 24-4). Lubricate the packing with White Petrolatum (Material No.P06-002), and install on the smaller adapter. Lubricate the adapter threads with Engine Oil (Material No.P03-001). Locate the angled port (SD OVER-BOARD DRAIN) at the end of the valve and install the adapter into the port.
R TORQUE the adapter to between 65 and 75 lbf.in. (0.73 and 0.84 m.daN).
NOTE : The end of valve with the angled port is opposite to the three port end of valve.
R (c)(Pre SB PW4ENG 24-4). Lubricate the packing with White Petrolatum (Material No.P06-002) and install it on the plug.
R Lubricate the plug threads with Engine Oil (Material No.P03-001) and install the plug in the smaller port of the three ports at the end of the valve. TORQUE the plug to between 65 and 75 lbf.in. (0.73 and 0.85 m.daN).
R (d)Install a packings, lubricated with White Petrolatum (Material No.P06-002), on the two larger adapters. Lubricate adapter threads with Engine Oil (Material No.P03-001), and install adapters in two remaining ports.
R TORQUE the adapters to between 110 and 120 lbf.in. (1.24 and 1.35 m.daN).

R (e)Install the air shut off valve drain tube (CR10) as follows.
R 1 (Pre SB PW4ENG 79-49). Lubricate the threads of the smaller adapter with Antigalling Compound (Material No.P06-003), and attach the tube to the adapter and to the hole in the tube flange on the heat exchanger.
R Secure the coupling on the tube to the heat exchanger with a jamnut, threads lubricated with Engine Oil (Material No.P03-001).
R 2 (Post SB PW4ENG 79-49). Lubricate the threads of the smaller adapter with Antigalling Compound (Material No.P06-003), and attach the tube to the adapter and to the hole in the tube flange on the heat exchanger with a plate between flats on the tube and the flange.
R Lubricate the threads on the coupling end of the tube with Engine Oil (Material No.P03-001) and secure it with a washer and a jamnut.
R 3 TORQUE tube nut to between 90 and 100 lbf.in. (1.01 and 1.13 m.daN).
R TORQUE the jamnut to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
R Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292) the tube nut and the jamnut.
R (f)Install the air/oil cooler valve return tube (CR11) and the air/oil cooler valve hydraulic tube (CP09) as follows.
R 1 (Pre SBPW4ENG 79-49). Lubricate the threads on the remaining adapters with Antigalling Compound (Material No.P06-003).
R Attach the tubes to the remaining adapters, with the couplings on the tubes through the tube flange on the heat exchanger.
R Lubricate the threads on the couplings with Engine Oil (Material No.P03-001) and secure them with the jamnuts.
R 2 (Post SB PW4ENG 79-49). Lubricate the threads on the remaining adapters with Antigalling Compound (Material No.P06-003).
R Attach the tubes to the remaining adapters, with the couplings on the tubes through the plate and the tube flange on the heat exchanger.
R Lubricate the threads on the couplings with Engine Oil (Material No.P03-001) and secure them to the tubes with washers and jamnuts.
R NOTE : (Post SB PW4ENG 24-7) New CP09 and CR11 tubes with revised clamping were introduced to raise the natural frequency of these tubes well above the engine operating range.
R (Post SB PW4ENG 24-9) Further modified CP09 and CR11 tubes and tube clamping were provided to better align and fit the tubes than those introduced with SB PW4ENG 24-7.
R (Post SB PW4ENG 24-10) Further modified CR11 tube to correct the SB PW4ENG 24-9 tube data requirements to eliminate the possibility of a tube chafe against the intermediate case centerbody when IDG Air Oil Cooler is installed.
R 3 TORQUE the tube nuts to between 200 and 225 lbf.in. (2.26 and 2.54 m.daN). TORQUE the jamnuts to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
R Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292) the tube nuts and the jamnuts.
R NOTE : If the tubes, clamps, bolts and nuts which secure the tubes have been removed, clamp the tubes together (Ref. Fig. 404) (Ref. Fig. 403, 405, 406) (sheet 1/2 or 2/2 as applicable).

R (5)If a new heat exchanger is to be installed, comply with the following :
R (a)Install the upper and lower mount brackets on the heat exchanger.
R Secure brackets with bolts, threads lubricated with Engine Oil
R (Material No.P03-001).
R TORQUE the bolts to between 85 and 95 lbf.in. (0.96 and1.07 m.daN).
R (6)Secure the air shutoff valve drain tube clamp to the cable shield with
R a bolt, threads lubricated with Engine Oil (Material No.P03-001). TORQUE
R the bolt to between 36 and 40 lbf.in (0.4 and 0.45 m.daN).
(7)Install air/oil heat exchanger and valve (IDGS) to engine (Ref. 24-11-21, P. Block 401).

D. Close-Up
(1)Close right thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers 1XT, 2XT, 3XT, 4XT, 15XU adn 18XU.

AIR/OIL HEAT EXCHANGER VALVE (IDG) - ADJUSTMENT/TEST

1. Reason for the Job

This test deals with the visual check of the IDG air/oil heat exchanger valve closed position in presence of 3 conditions :
-IDG air/oil heat exchanger valve solenoid energized
-Pneumatic pressure (PS3) on the pressure switch
-Fuel pressure on the valve actuator (PF from FMU).

2. Equipment and Materials

ITEM	DESIGNATION
A. PWA49030	Hydraulic Pump (optional to CTE5100) (0 - 1.250 psi)
B. CTE5100	Hydraulic Pump (optional to PWA49030)
C.	Container
D.	HP Pneumatic Source (0 - 80 psi)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 24-41-00, P. Block 301	AC External Power Control
- 71-00-00, P. Block 501	Power Plant - General

3. Procedure

A. Job Set-Up
(1)Open, safety and tag circuit breakers for the appropriate engine and open the right thrust reverser cowl door (Ref. 71-13-00, P. Block 301)
(2)Disconnect air supply tube from override solenoid PS3 port and blank it (Ref. Fig. 502).
(3)Position a container under the AOHE valve tubes connection with compressor stator cylinder hydraulic manifold and oil cooler inlet return manifold. (Ref. Fig. 501)
(4)Disconnect AOHE valve hydraulic tube from compressor stator cylinder hydraulic manifold and blank it.
(5)Disconnect AOHE valve return tube from oil cooler inlet return manifold and blank it.
(6)Disconnect inlet and return tubes from AOHE valve (Ref. Fig. 501).
(7)Connect HP Pneumatic Source hose to PS3 port of the AOHE valve override solenoid.
(8)Connect Hydraulic Pump to the inlet and return port of the AOHE valve.
(9)Make certain that the following circuit breakers are closed.

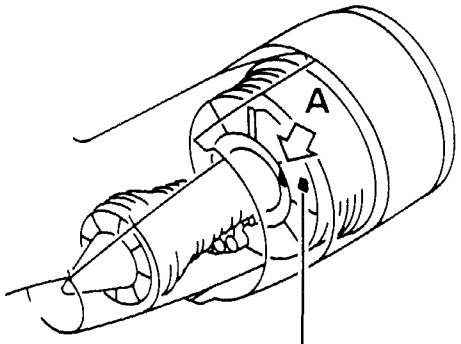
PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG2/FADEC SOLENOIDS/ CHANNEL A	18KS	332/U71
133VU	ENGINES/ENG1/FADEC SOLENOIDS/ CHANNEL A	19KS	332/U70
133VU	ENGINES/ENG2/FADEC SOLENOIDS/ CHANNEL B	20KS	331/V69

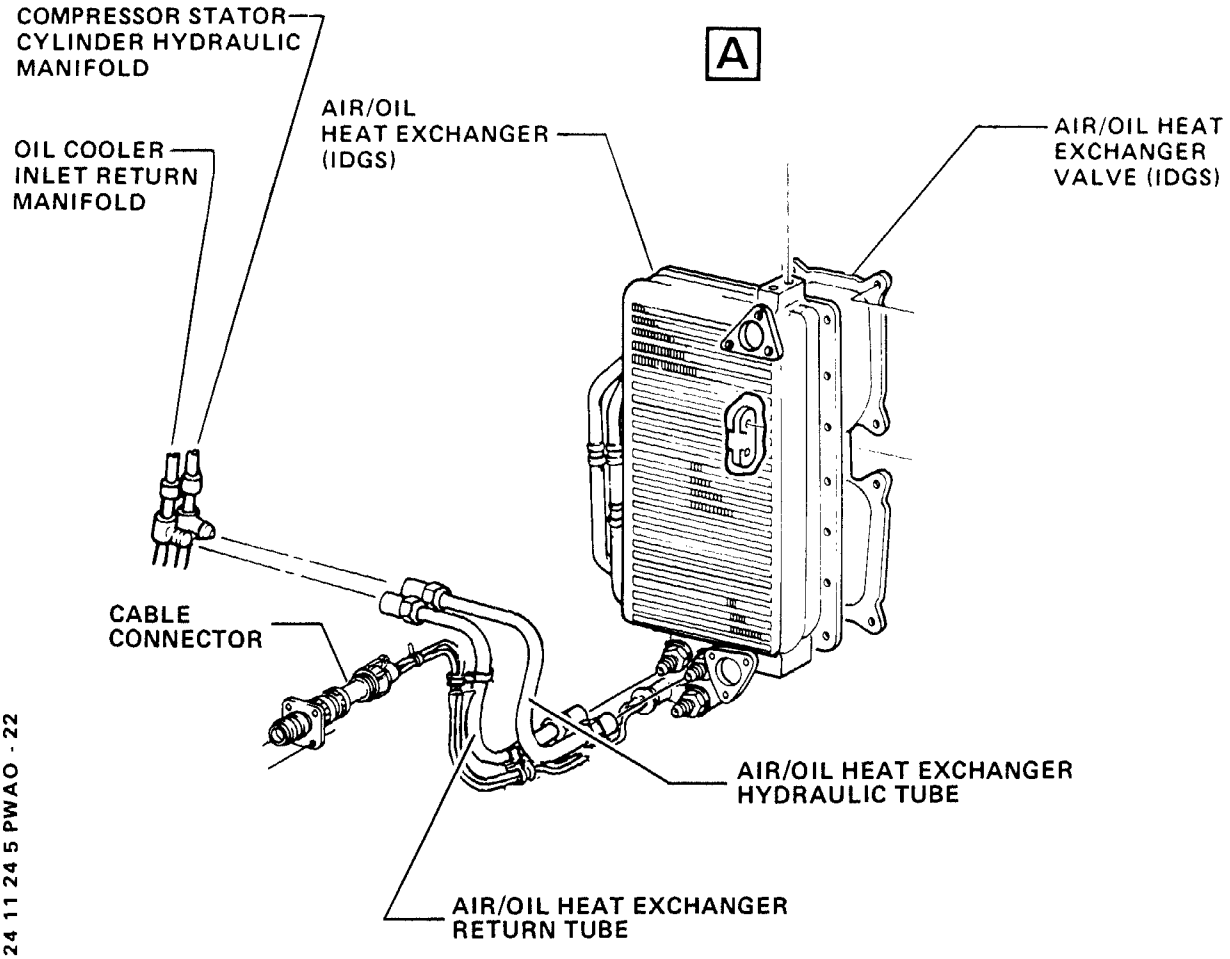
PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG1/FADEC SOLENOIDS/ CHANNEL B	21KS	331/V70
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80

(10)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

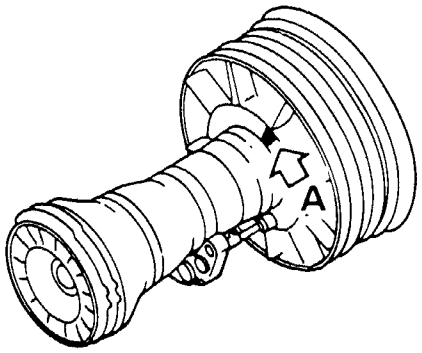
B. Test (Ref. Fig. 501)
(1)Supply fuel at a pressure of approximately 1250 psi.
(2)Check, using a mirror, for IDG AOHE valve open position.
R (3)Supply compressed air at a pressure of 80 psi.
(4)Check, using a mirror, for IDG AOHE valve closed position.

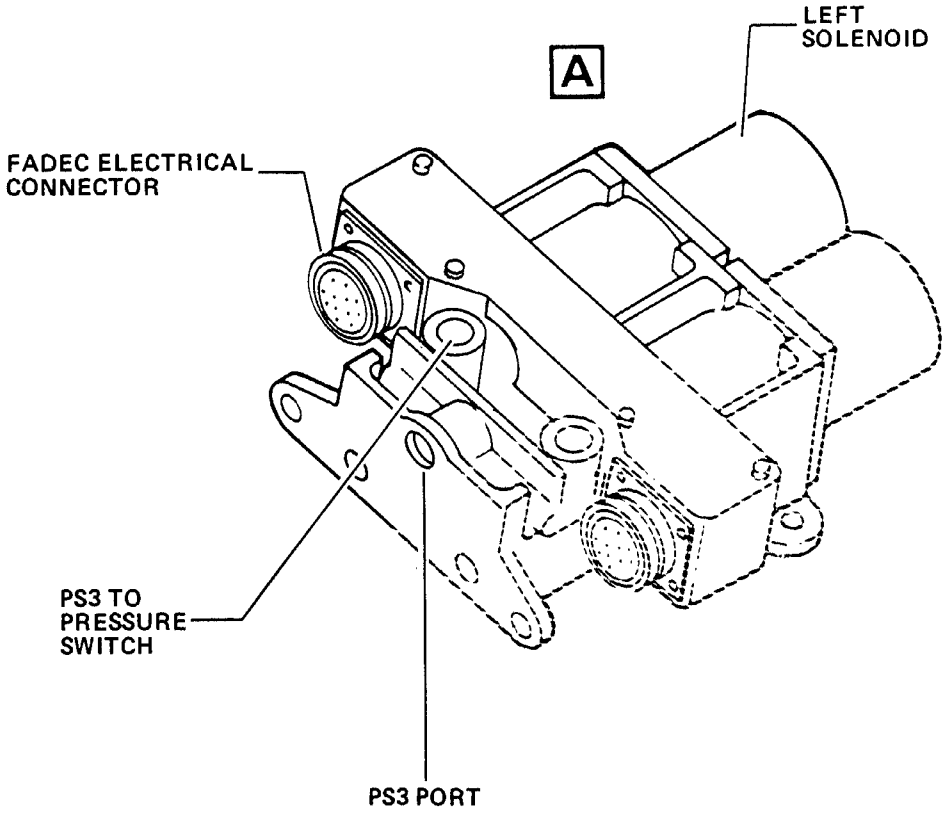
C. Close-Up
R (1)Reduce fuel pressure to 0 psi and disconnect Hydraulic Pump.
R (2)Reduce air pressure to 0 psi and disconnect HP Pneumatic Source.
(3)Connect air/oil heat exchanger valve tubes to the AOHE valve ports.
(4)Remove caps and connect compressor stator cylinder hydraulic manifold, oil cooler inlet return manifold to the AOHE valve tubes.
(5)Connect air supply tube to the AOHE valve override solenoid PS3 ports.
(6)Close right thrust reverser cowl door. Remove safety clips and tags and close circuit breakers (Ref. 71-13-00, P. Block 301).
(7)Perform an idle power ground test (Ref. 71-00-00, P. Block 501 test No. 3)
(8)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).





IDG Heat Exchanger Valve
Figure 501





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IDG Air/Oil Heat Exchanger Valve Solenoid
Figure 502

IDG AIR/OIL HEAT EXCHANGER VALVE - DEACTIVATION/REACTIVATION

R Ref. MMEL Sect. 1-24, Item 29 (IDG air cooling valve)

1. Deactivation

A. Reason for the Job

To lock IDG AIR/OIL EXCHANGER VALVE in OPEN position in order to keep IDG system operative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Lockwire
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(1)Job set-up

(a)Open, safety and tag the circuit breaker corresponding to the faulty valve :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80

(b)Open, safety and tag circuit breakers for the appropriate engine and Open RH fan cowl door (Ref. 71-13-00, P. Block 301).

(2)Deactivation

CAUTION : WEAR GOGGLES WHEN REMOVING LOCKWIRE.

(a)Cut and remove lockwire from manual override screw located on top of valve (orange head), and unscrew manual override screw.

(b)Place override handle in OPEN position in order to align hole in override handle with hole labelled OPEN on retaining plate.

(c)Install and screw manual override screw to retaining plate.

(d)Wirelock manual override screw to retaining plate.

(3)Close-up

(a)Close RH fan cowl door (Ref. 71-13-00, P. Block 301).

2. Reactivation

R A. Reactivation of the IDG AOHE Valve :

R (1)If the valve is defective, replace the valve (Ref. AMM 24-11-24, P. Block 401).

R (2)If the valve is not defective, do the troubleshooting procedure to identify the cause of the isolation valve malfunction and if necessary, replace the defective component(s).

R (a)Put the isolation valve in a serviceable condition.

IDG AIR/OIL HEAT EXCHANGER VALVE - DEACTIVATION/REACTIVATION

R Ref. MMEL Sect. 1-24, Item 29 (IDG air cooling valve)

1. Deactivation

A. Reason for the Job

To lock IDG AIR/OIL EXCHANGER VALVE in OPEN position in order to keep IDG system operative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Lockwire
Referenced Procedure	
- 24-11-24, P. Block 401	Air Oil Heat Exchanger Valve (IDG)
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(1)Job set-up

(a)Open, safety and tag the circuit breaker corresponding to the faulty valve :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80

(b)Open, safety and tag circuit breakers for appropriate engine and open right thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

(2)Deactivation

(Ref. Fig. 901)

(a)Visually check that both butterflies of the valve are in open position through the 2.5 bleed duct part using a mirror.

NOTE : The Bite of the GCU will record a failure associated with the open breaker (1XT or 2XT).

(3)Close-up

(a)Close RH thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

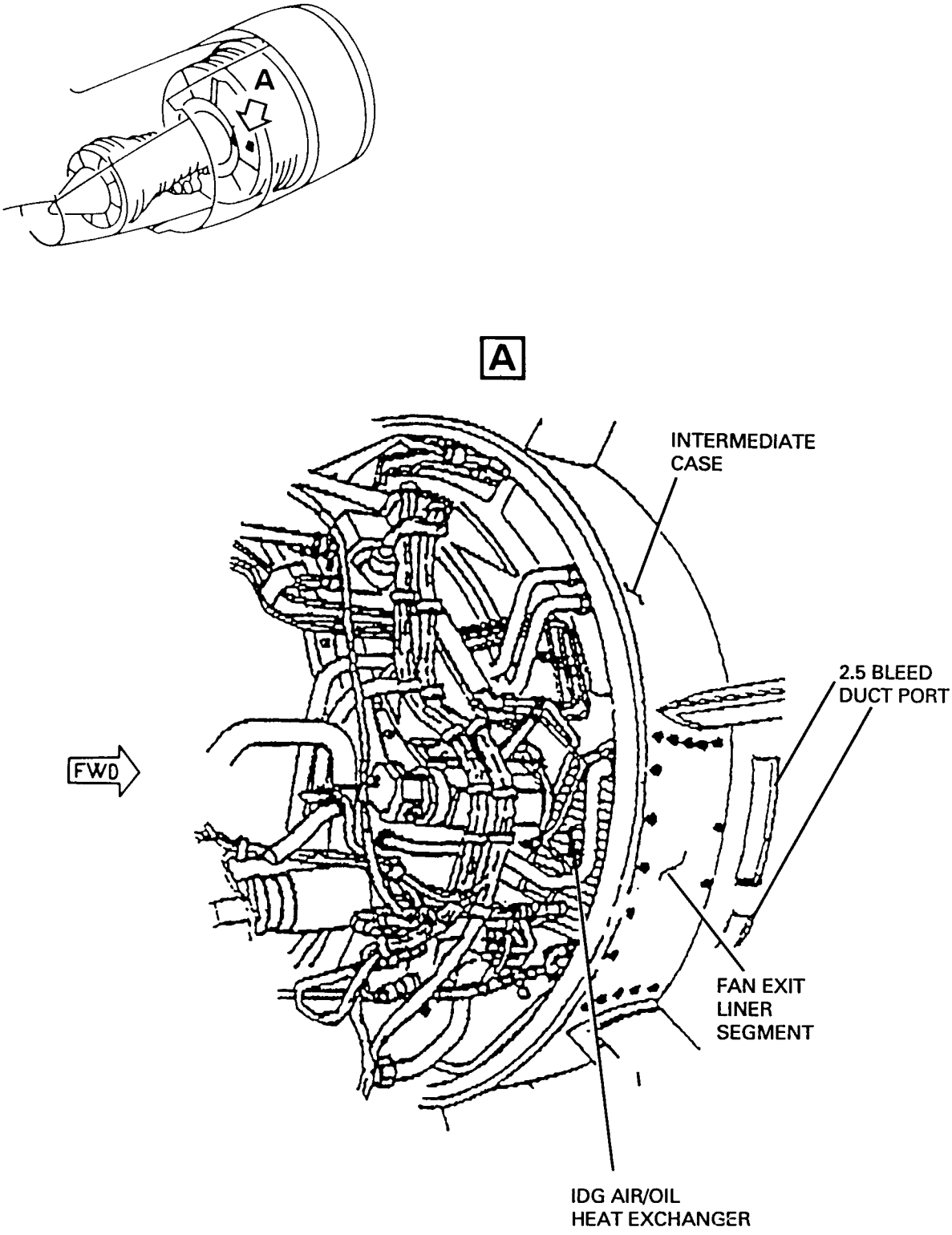
2. Reactivation

R A. Reactivation of the IDG AOHE Valve :

R (1)If the valve is defective, replace the valve (Ref. AMM 24-11-24, P. Block 401).

R (2)If the valve is not defective, do the troubleshooting procedure to identify the cause of the isolation valve malfunction and if necessary, replace the defective component(s).

R (a)Put the isolation valve in a serviceable condition.



IDG Air/Oil Heat Exchanger Valve
Figure 901

IDG FUEL/OIL HEAT EXCHANGER - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B. Material No.C02-019	Antiseize compounds, lubricants, oils
C.	Torque Wrench 0-100 lbf.in. (0.0-13.6 m.daN)
D.	Torque Wrench 50-600 lbf.in. (0.56-6.8 m.daN)
E.	Container, 5 gal (19 l) capacity
F.	Caps and Plugs
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power
- 24-11-00, P. Block 601	IDG System
- 71-00-00, P. Block 501	General
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK THE TEMPERATURE OF THE OIL AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the circuit breakers for the appropriate engine and open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(2)On IDG, press to vent valve first to remove internal pressure from oil system.

B. Removal (Ref. Fig. 401)

WARNING : DO NOT LET THE OIL GET ON YOUR SKIN. THE OIL CAN CAUSE SKIN PROBLEMS.
USE CAUTION WHEN YOU DO WORK WITH THE OIL SYSTEM. THE OIL CAN STAY HOT FOR A LONG TIME. HOT OIL CAN CAUSE INJURIES.

(1)Put the container below the IDG fuel/oil heat exchanger.

(2)Disconnect the oil-in tube and the oil-out tube from the IDG fuel/oil heat exchanger (heat exchanger).

(a)Let the oil from the disconnected tubes drain into the container.

(3)Remove the bolts and the washers that hold the mounting bracket for the heat exchanger to the support bracket.

WARNING : DO NOT USE FUEL NEAR FLAMES OR HEAT OR LET IT STAY ON YOUR SKIN. ALSO, MAKE SURE YOU HAVE A GOOD FLOW OR CLEAN AIR. THIS MATERIAL IS FLAMMABLE AND DANGEROUS TO YOUR SKIN, EYES, AND LUNGS.

(4)Remove the bolts and the washers that hold these parts to the heat exchanger :

(a)The fuel-in tube

(b)The fuel-in spray shield

(c)The mounting bracket.

(5)Let the fuel from the disconnected tube drain into the container.

(6)Remove the fuel-in spray shield and the gasket.

(a)Discard the gasket.

(7)Remove the bolts and the washers that hold these parts to the heat exchanger :
(a)The fuel-out tube
(b)The fuel-out spray shield.
(8)Remove the fuel-out spray shield and the gasket.
(a)Discard the gasket.
(9)Remove the heat exchanger from the engine.
(10)Install protective caps and plugs on the oil-in-tube, the oil-out tube, the fuel-in tube, the fuel-out tube.
(11)Install protective caps and plugs on the fuel-in port and the fuel-out port of the heat exchanger.
(12)Do these steps if you will install a new heat exchanger.
(a)Remove the oil-in and the oil-out fittings from the heat exchanger.
NOTE : Keep the oil-in and the oil-out fittings for the subsequent installation.
(b)Discard the preformed packings.
(c)Install protective caps and plugs on the oil-in port and the oil-out port of the heat exchanger.

C. Installation (Ref. Fig. 401)
(1)Do these steps if you will install a new IDG fuel/oil heat exchanger (heat exchanger).
(a)Remove the protective caps and plugs from the oil-in port and the oil-out port on the heat exchanger.
(b)Lubricate two new preformed packings with Material No.C02-019.
(c)Install the preformed packings on the oil-in fitting and the oil-out fitting.
(d)Install the oil-in fitting and the oil-out fitting into the oil-in port and the oil-out port.
(e)TORQUE to between 555 and 645 lbf.in. (6.27 and 7.28 m.daN).
(2)Remove the protective caps and plugs from the fuel-in port and the fuel-out port.
(3)Remove the protective caps and plugs from the oil-in tube, the oil-out tube, the fuel-in tube, the fuel-out tube.
(4)Put the heat exchanger, the new gasket, the fuel-out spray shield, and the fuel-out tube in their correct position on the support bracket.
(a)Make sure that the holes for the bolts align.
(b)Install the bolts and washers.
(c)Tighten the bolts with your hand.
(5)Put the mounting bracket, the bracket, the fuel-in spray shield, the new gasket, and the fuel-in tube in their correct position on the heat exchanger.
(a)Make sure that the holes for the bolts align.
(b)Install the bolts and washers.
(c)Tighten the bolts with your hand.
CAUTION : IT IS NECESSARY THAT THE MOUNTING BRACKET BE PERMITTED TO MOVE FREELY UNTIL THE FUEL TUBES HAVE BEEN CORRECTLY TIGHTENED. IF YOU TIGHTEN THE BOLTS ON THE MOUNTING BRACKET BEFORE YOU TIGHTEN THE FUEL TUBES, YOU CAN CAUSE FUEL LEAKS.
(6)Tighten the bolts that attach the mounting bracket with your fingers. Let the mounting bracket move freely in the limits of the slotted holes until

the fuel tubes have been correctly tightened.

(7)Connect the oil-in tube and the oil-out tube.
   (a)Tighten the coupling nuts with your hand.

(8)**TORQUE** the bolts that hold the fuel-in tube and the fuel-out tube to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

(9)**TORQUE** the coupling nuts that attach the oil-in tube and the oil-out tube to between 75 and 91 lbf.ft. (10.2 and 12.3 m.daN).

(10)**TORQUE** the bolts that attach the mounting bracket to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN).

CAUTION : IF YOU SEE AN INDICATION OF INCORRECT SEATING OF THE GASKETS, CLEARANCE BETWEEN ATTACHED PARTS, OR DAMAGED (BENT) BRACKETS, REPAIR AS NECESSARY OR FUEL LEAKS CAN OCCUR.

(11)Do a visual inspection of the following :
- The gaskets
- The fuel-in/out tubes
- The heat exchanger
- The mounting bracket
- The fuel-in/out sprayshields
- The support bracket.

   (a)If you see an indication of incorrect seating of the gaskets, clearance between attached parts, or damaged (bent) brackets, repair as necessary or fuel leaks can occur.

D. Close-Up

(1)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3)Close fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tags and close circuit breakers.

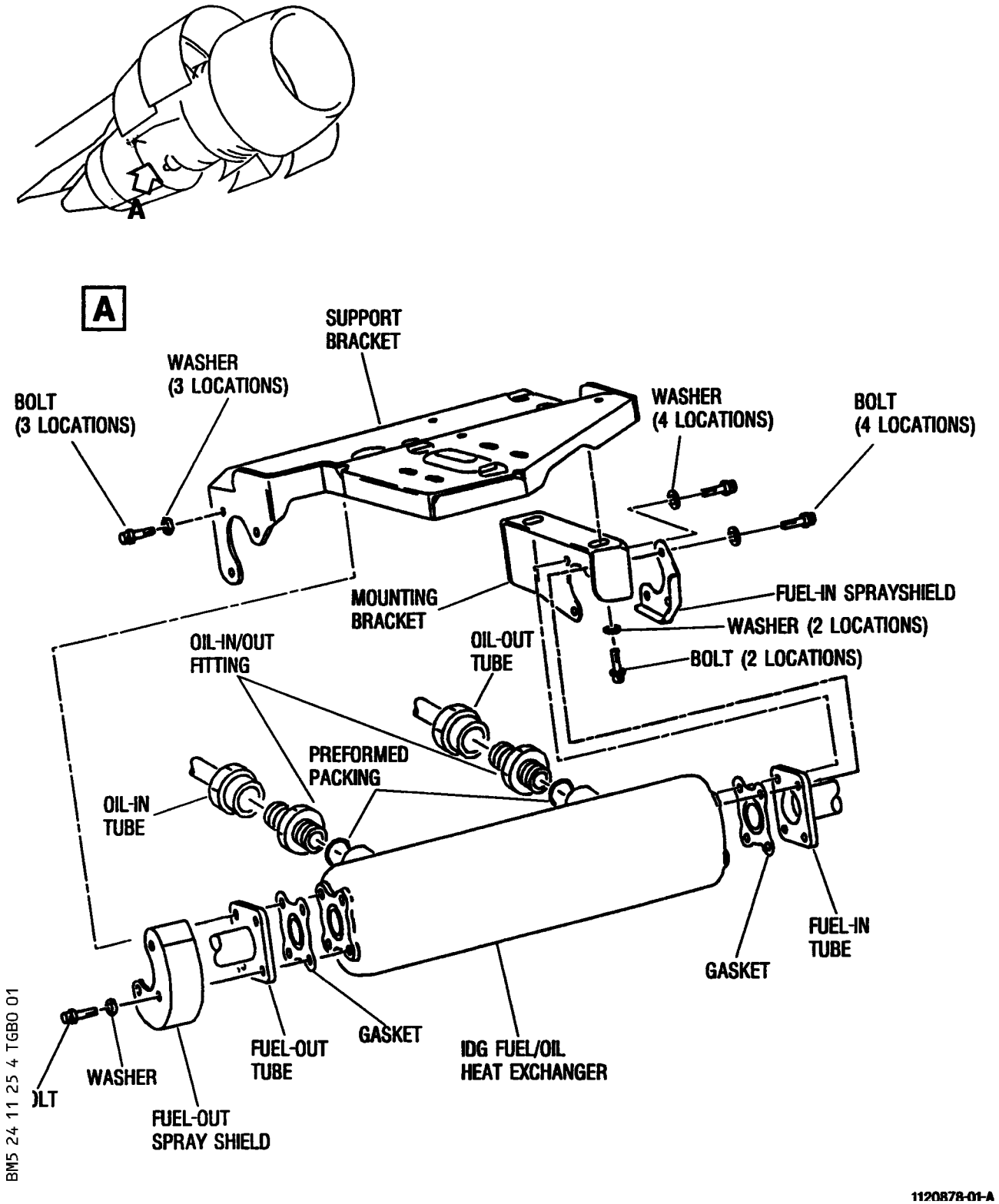
E. Test

(1)Do the engine wet motor to correctly examine the fuel lines (Ref. 71-00-00, P. Block 501).

(2)Do the minimum idle run (Ref. 71-00-00, P. Block 501) and check for leaks.

(3)Check IDG oil system for leakage at first engine start-up (Ref. 24-11-00, P. Block 601).

(4)Check IDG oil level (Ref. 24-11-00, P. Block 601) and top up if necessary (Ref. 12-13-24, P. Block 1).



IDG Fuel/Oil Heat Exchanger
Figure 401

1. Oil Pressure Relief Valve (IDG)

A. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Container

Referenced Procedures

- 71-13-00, P. Block 301 Cowl Doors D
- 12-13-24, P. Block 1 Electrical Power D
- 24-11-00, P. Block 601 IDG System D

B. Procedure

(1)Job Set-Up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK TEMPERATURE AND LET IT COOL IF NECESSARY.

(a)Open, safety and tag circuit breakers for the appropriate engine and open L fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(b)On IDG press to vent valve first to remove internal pressure from oil system.

(2)Removal (Ref. Fig. 401)

(a)Place a suitable container under valve, disconnect outlet tube from valve and allow to drain.

(b)Remove valve from mounting boss and install protective covers on boss coupling valve ports.

(3)Installation (Ref. Fig. 401)

(a)Remove protective covers from valve ports, tubes, and boss coupling.

(b)Connect valve to mounting boss and TORQUE coupling nut to between 450 and 550 lbf.in. (5.08 and 6.21 m.daN).

(c)Connect outlet tube to valve and TORQUE coupling to between 270 and 300 lbf.in (3.05 and 3.39 m.daN).

(4)Close-Up

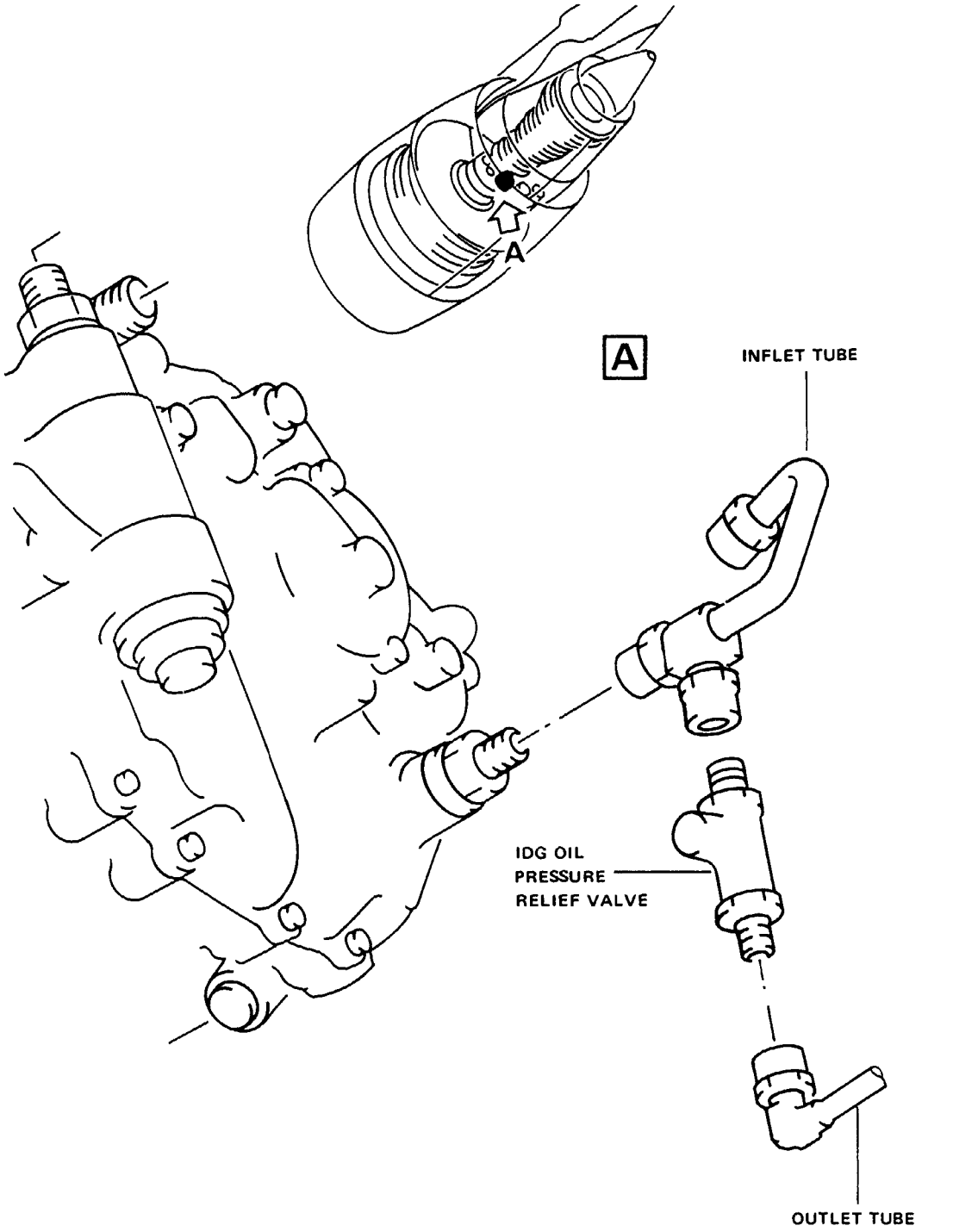
(a)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).

(b)Remove safety clips and tags and close circuit breakers. Close L fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(5)Test

(a)Check IDG oil system for leakage at first engine start-up (Ref. 24-11-00, P. Block 601).

(b)Check oil level in IDG (Ref. 24-11-00, P. Block 601) and top up if necessary (Ref. 12-13-24, P. Block 1).



Oil Pressure Relief Valve
Figure 401

R 2. IDG Oil Cooling Tubing

R A. Equipment and Materials

ITEM	DESIGNATION	
A.	Container - 2 US gallons (7.57 l)	
B.	Circuit Breaker Safety Clips	
C.	Torque Wrenches	
D. Material 03-002	Oil (Ref. 20-31-00)	M
E. Material C02-019	Anti-Seize Compounds, Lubricants, Oils (Ref. 70-00-00)	M

Referenced Procedures

- 12-13-24, P. Block 1	Electrical Power	D
- 24-11-11, P. Block 401	IDG System	D
- 71-13-00, P. Block 301	Cowl Doors	D

R B. Procedure

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFR1/CSNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(b)Open the fan cowl and thrust reverser doors (Ref. 71-13-00, P. Block 301).

WARNING : HOT OIL MAY CAUSE BURNS TO EYES AND SKIN. IF THE IDG HAS BEEN IN OPERATION RECENTLY, CHECK OIL TEMPERATURE AND LET IT COOL AS NECESSARY. WEAR SPLASH GOOGLES, INSULATED GLOVES, AND OTHER PROTECTIVE WEAR.

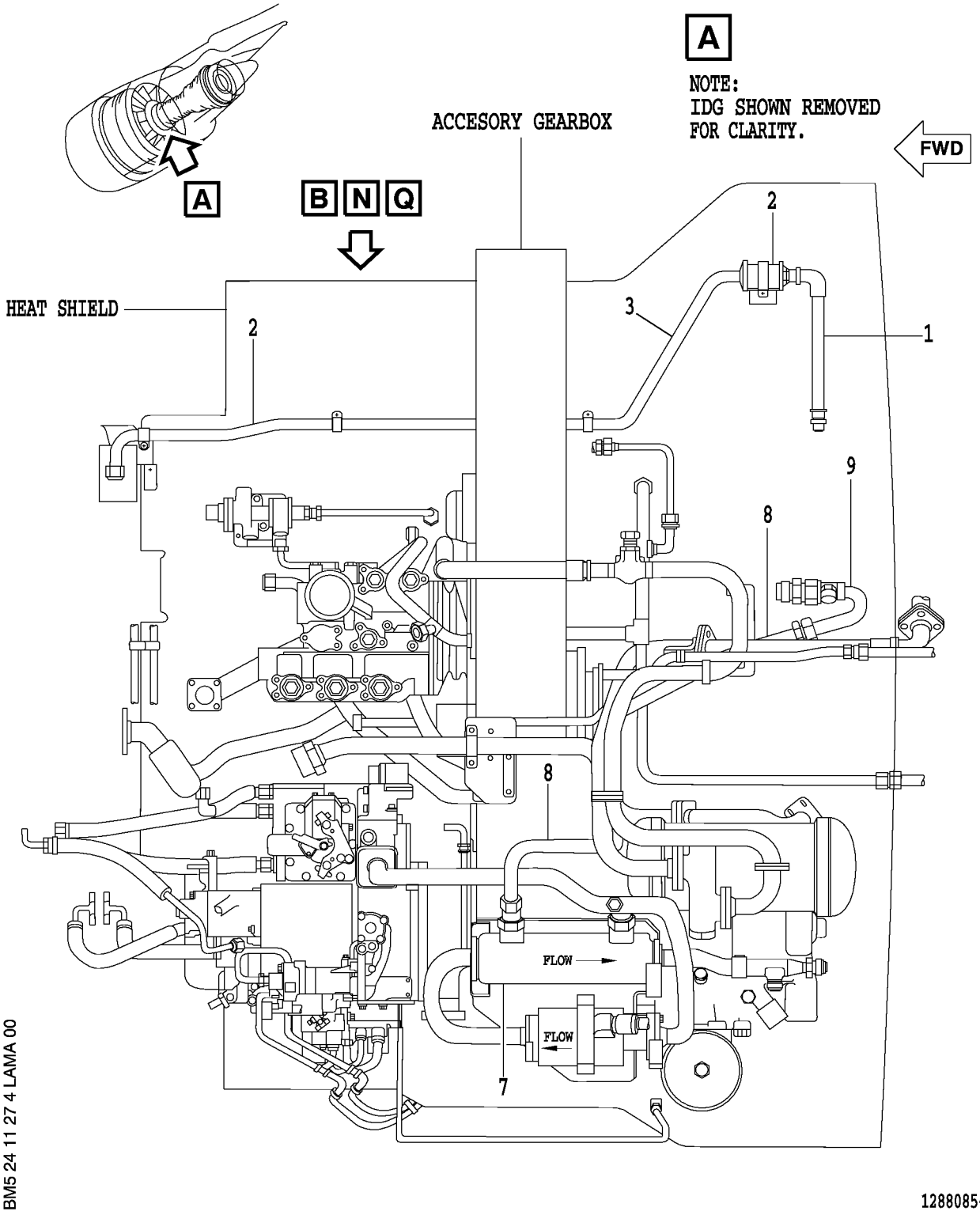
(c)Depressurize the IDG case.

WARNING : YOU MUST PUT THE DRAIN HOSE IN TO A CONTAINER BEFORE YOU CONNECT THE HOSE TO THE OVERFLOW DRAIN VALVE. MAKE SURE THAT THE DRAIN HOSE HANGS DOWN VERTICAL AND THE END OF THE HOSE IS ABOVE THE OIL LEVEL IN THE CONTAINER. WHEN YOU CONNECT THE DRAIN HOSE TO THE IDG YOU RELEASE THE OIL PRESSURE AND OIL WILL SPRAY FROM THE DRAIN HOSE AND INJURY CAN OCCUR.

1 Put a suitable container below the IDG.
2 Remove the dust cap from the overflow drain valve.
3 Put an overflow drain hose into the container to prevent spraying hot oil.
4 Connect the drain hose to the overflow drain valve. (Some oil may come out of the drain hose when it is connected).
5 Remove the overflow drain hose from the overflow drain valve.
6 Install the dust cap on the overflow drain valve.

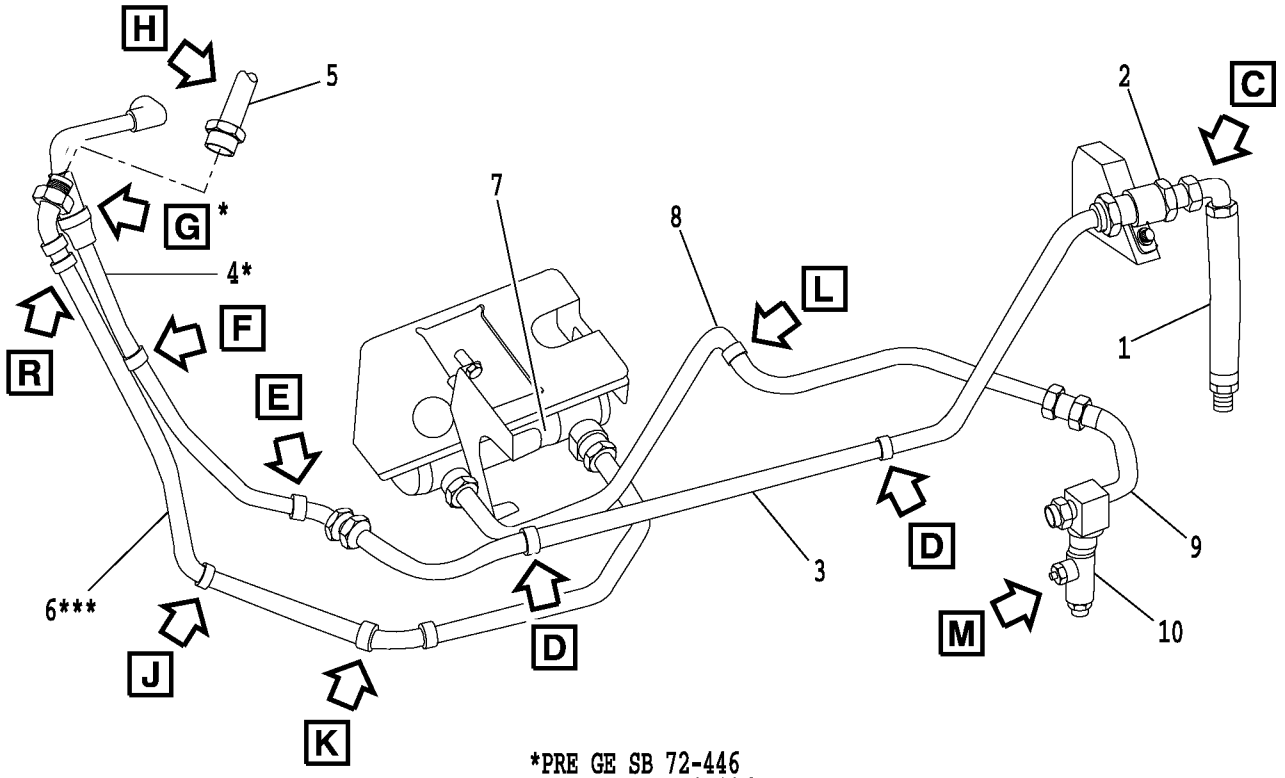
R (2)Removal of the IDG oil cooling tubing
R (Ref. Fig. 402)
R (a)Put the container under the engine to catch the oil that drains during the removal of the tubing.
R (b)Disconnect the oil tube and hose (1) from the IDG.
R (c)Disconnect the oil tube and hose (1) from the check valve (2).
R (d)Remove the oil tube and hose (1).
R (e)Disconnect the oil tube (3) from the check valve (2). Discard the preformed packing (63).
R (f)Remove the bolt (11), washer (12), clamp (13) and nut (14) that attach the check valve (2).
R (g)Remove the check valve (2).
R (h)Remove the nut (15), spacer (16), clamp (17) and bolt (18) that attach the oil tube (3) to the heat shield.
R Pre SB GE 72-446
R (i)Remove the nut (15), spacer (16), clamp (17) and bolt (18) that attach the oil tube (3) to the heat shield.
R (j)Disconnect the oil tube (3) from the oil tube (4). Remove the oil tube (3).
R (k)Remove the nut (19), clamp (20) and bolt (21) that attach the oil tube (4) to the bracket (22) on the heat shield.
R (l)Remove the nut (23), spacer (24), clamp (25) and bolt (26) that attach the oil tube (4) to the bracket (27) on the heat shield.
R Post SB GE 72-036
R (m)Remove the nut (28), clamp (29) and bolt (30) that attach the oil tube (4) to the Main Engine Control hose.
R End Post SB GE 72-036
R End Pre SB GE 72-446
R Post SB GE 72-446
R (i)Remove the bolt (53), clamp (54) and spacer (55) that attach the oil tube (3) to the heat shield.
R (j)Remove the bolt (56), clamp (57), spacer (58) and nut (59) that attach the oil tube and hose (4) to the spray shield (62) and the VBV cable.
R (k)Remove the bolt (60), clamp (61) and spray shield (62) that attach the oil-air tube (3) to the heat shield.
R (l)Disconnect the oil-air tube (3) from the oil tube and hose (4). Remove the oil-air tube (3).
R (m)Not applicable.
R End Post SB GE 72-446
R (n)Loosen the B-nut on the oil tube and hose (4) from the inlet of the air/oil heat exchanger.
R (o)Remove the oil tube and hose (4).
R (p)Remove the four bolts (31) and the seal gasket (32) that attach the oil tube and hose (5) to the outlet of the air/oil heat exchanger. Discard the seal gasket.
R (q)Disconnect the oil tube and hose (5) from oil tube (6). Remove the oil tube and hose (5).
R Pre SB GE 72-116
R (r)Remove the bolt (33), clamp (34) and nut (35) securing the oil tube (6) to the bracket (36).
R (s)Not applicable.

R (t)Not applicable.
R (u)Not applicable.
R End Pre SB GE 72-116
R Post SB GE 72-116
R (r)Remove the bolt (37), clamp (38) and nut (39) securing the oil tube (6) to the MEC.
R (s)Remove the two bolts (40), two clamps (41) and two nuts (42) that attach the oil tube (6) to the fuel drain manifold.
R (t)Remove the bolt (43), clamp (44) and nut (45) that attach the oil tube (6) to the VBV/VSV drain tube.
R (u)Remove the bolt (46), clamp (47) and nut (48) that attach the oil tube (6) to the N1 fuel drain tube.
R End Post SB GE 72-116
R (v)Disconnect the oil tube (6) from the inlet of the IDG fuel/oil heat exchanger (7). Remove the oil tube (6).
R (w)Disconnect the oil tube (8) from the outlet of the IDG fuel/oil heat exchanger (7).
R (x)Remove the bolt (49), clamp (50) and nut (51) that attach the oil tube (8) to the bracket (52).
R (y)Disconnect the oil tube (8) from the oil tube (9).
R (z)Remove the oil tube (8).
R (aa)Disconnect the IDG pressure relief valve (10) from the oil tube (9). Remove the IDG pressure relief valve.
R (ab)Disconnect the oil tube (9) from the IDG. Remove the oil tube (9).



IDG Oil Tubing (Sheet 1/8)
Figure 402

R



*PRE GE SB 72-446
**POST GE SB 72-036
***POST GE SB 72-403

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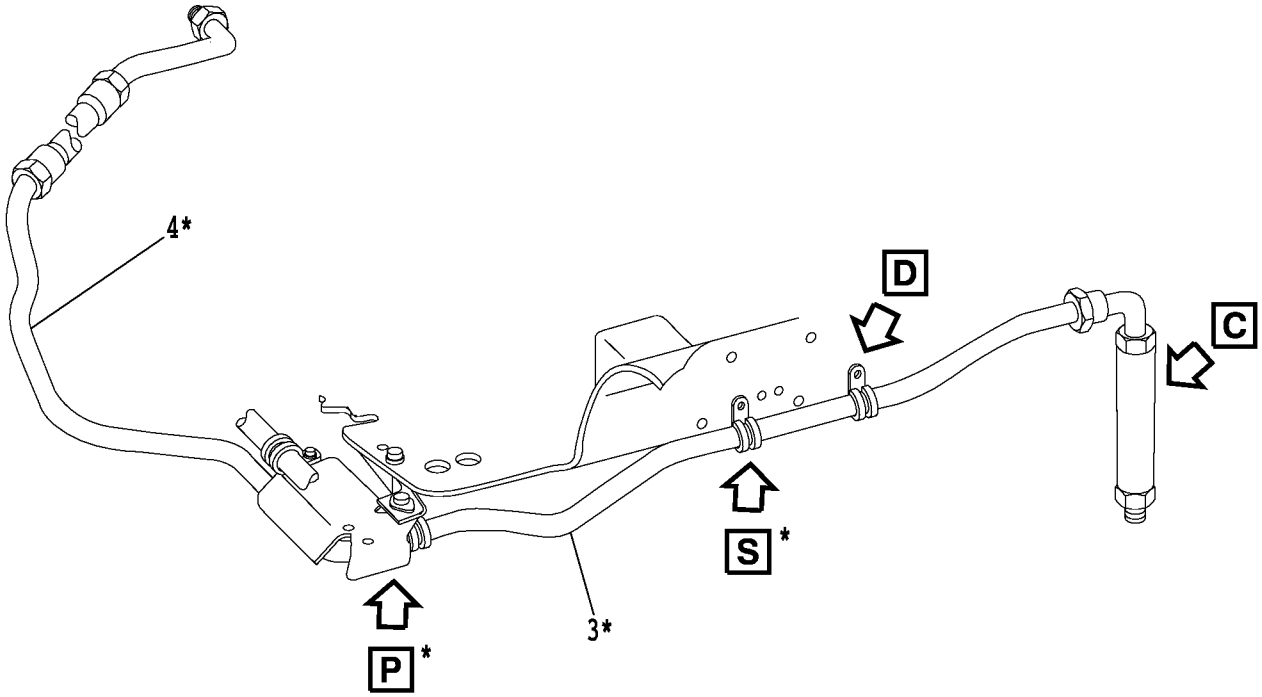
IDG Oil Tubing (Sheet 2/8)
Figure 402

R



*POST GE SB 72-446

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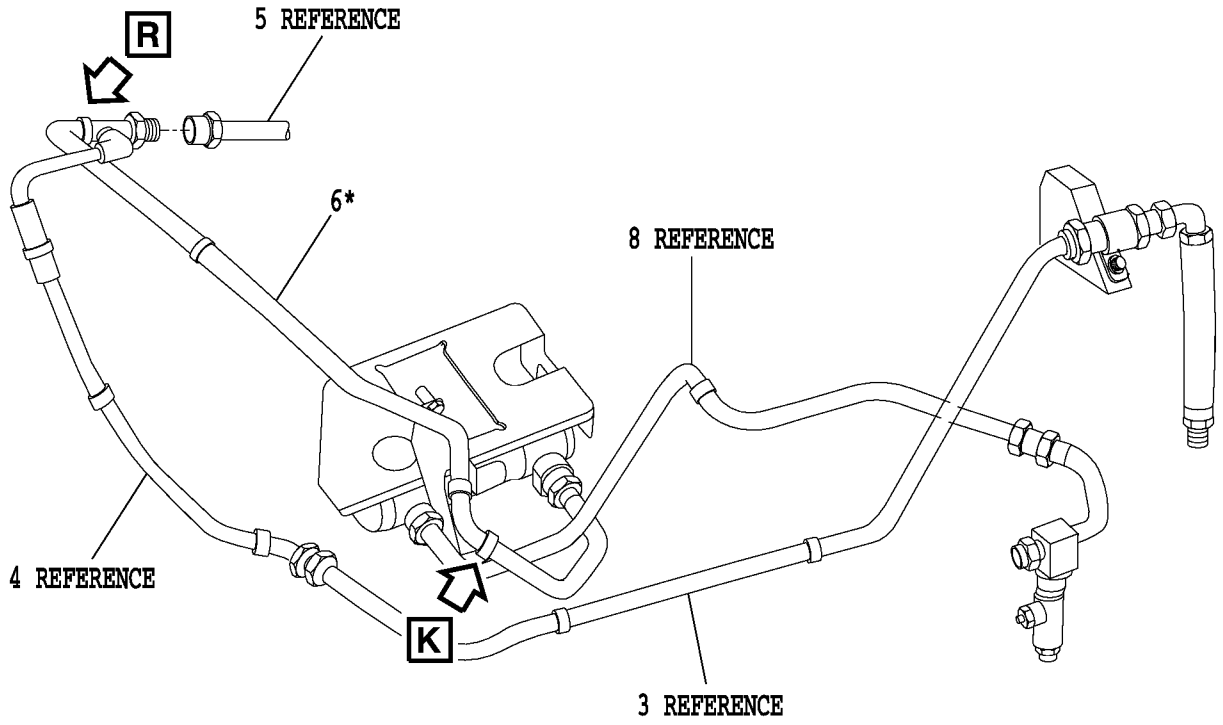
IDG Oil Tubing (Sheet 3/8)
Figure 402

R



*POST GE SB 72-403

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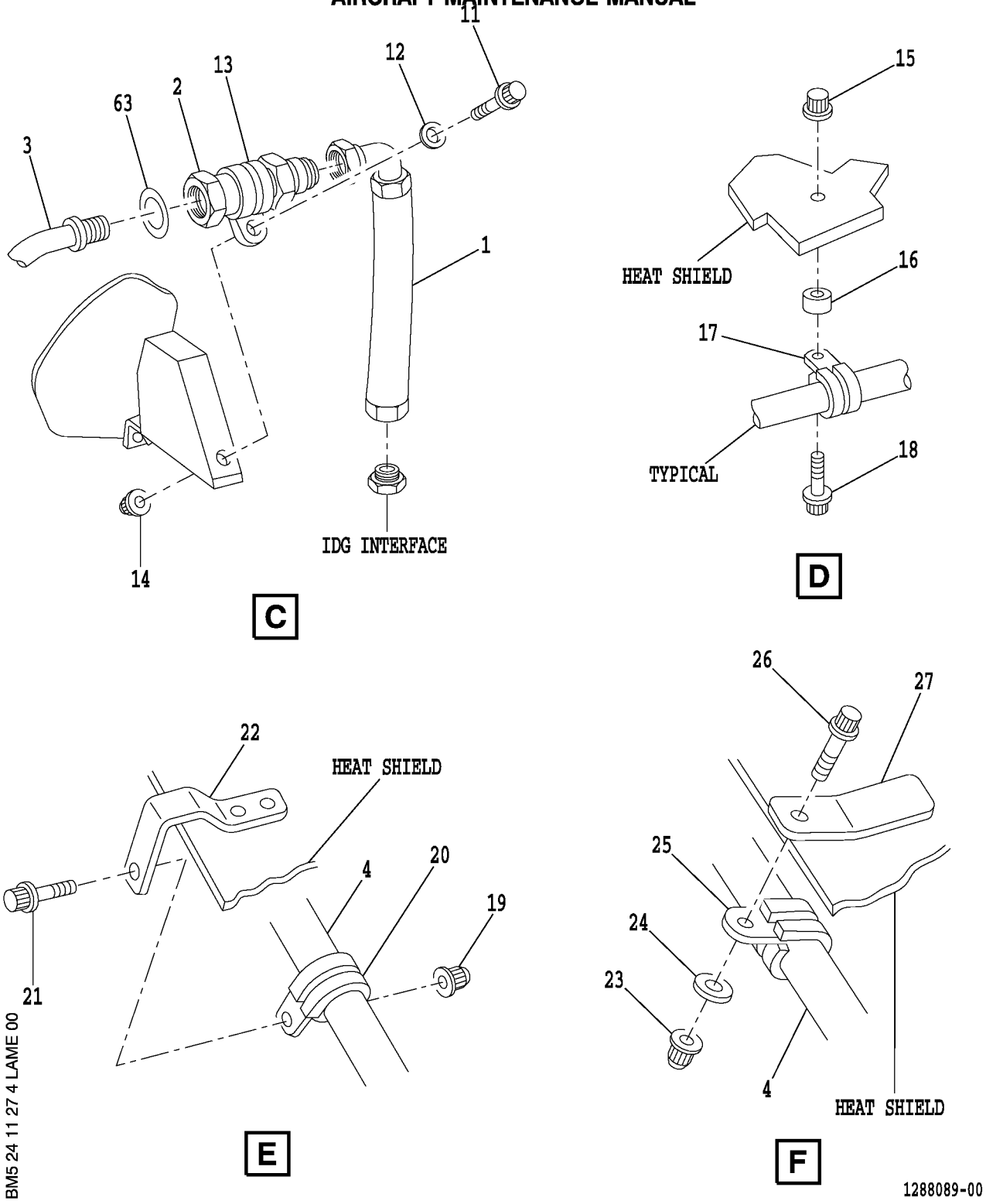
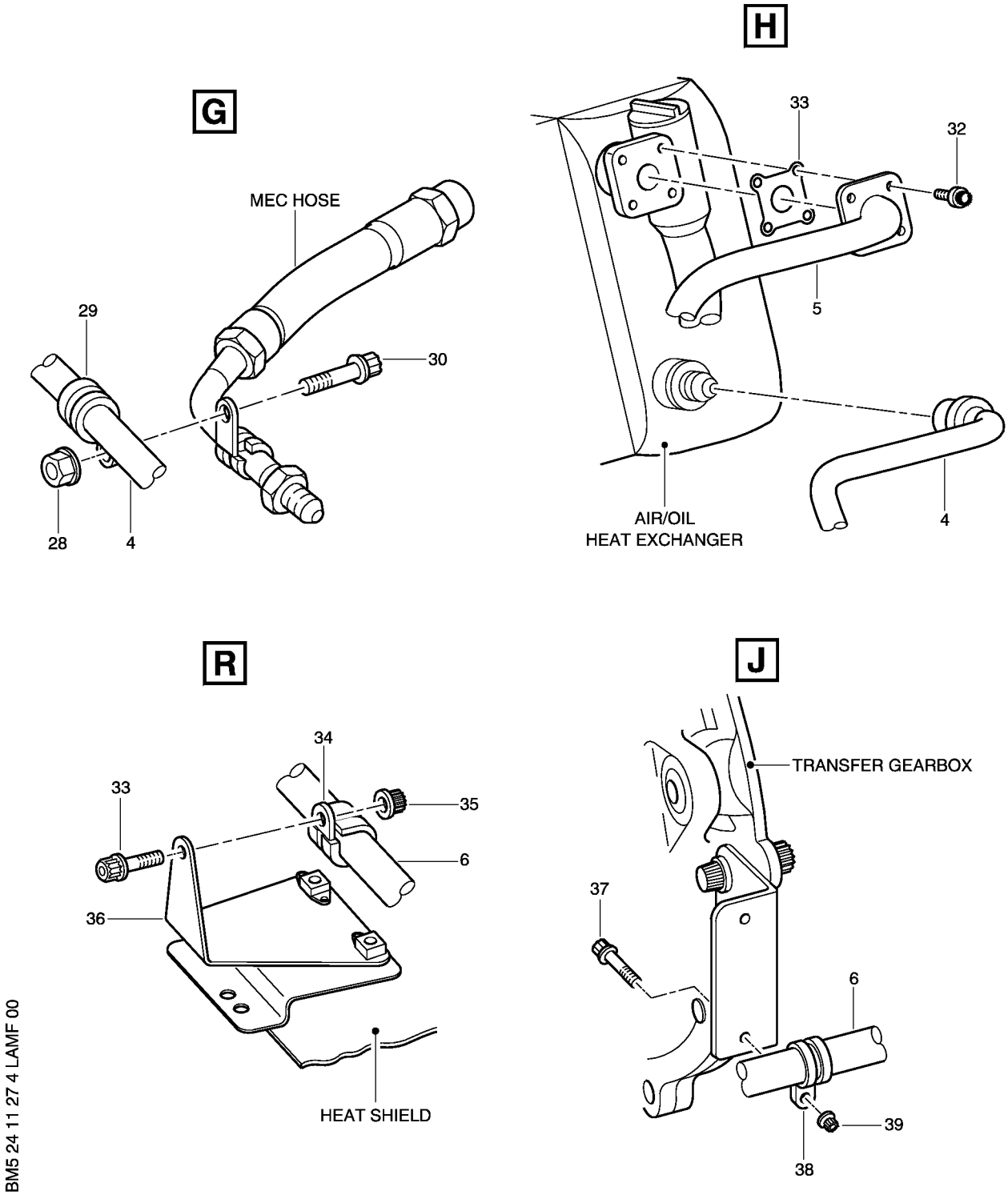
IDG Oil Tubing (Sheet 4/8)
Figure 402

R



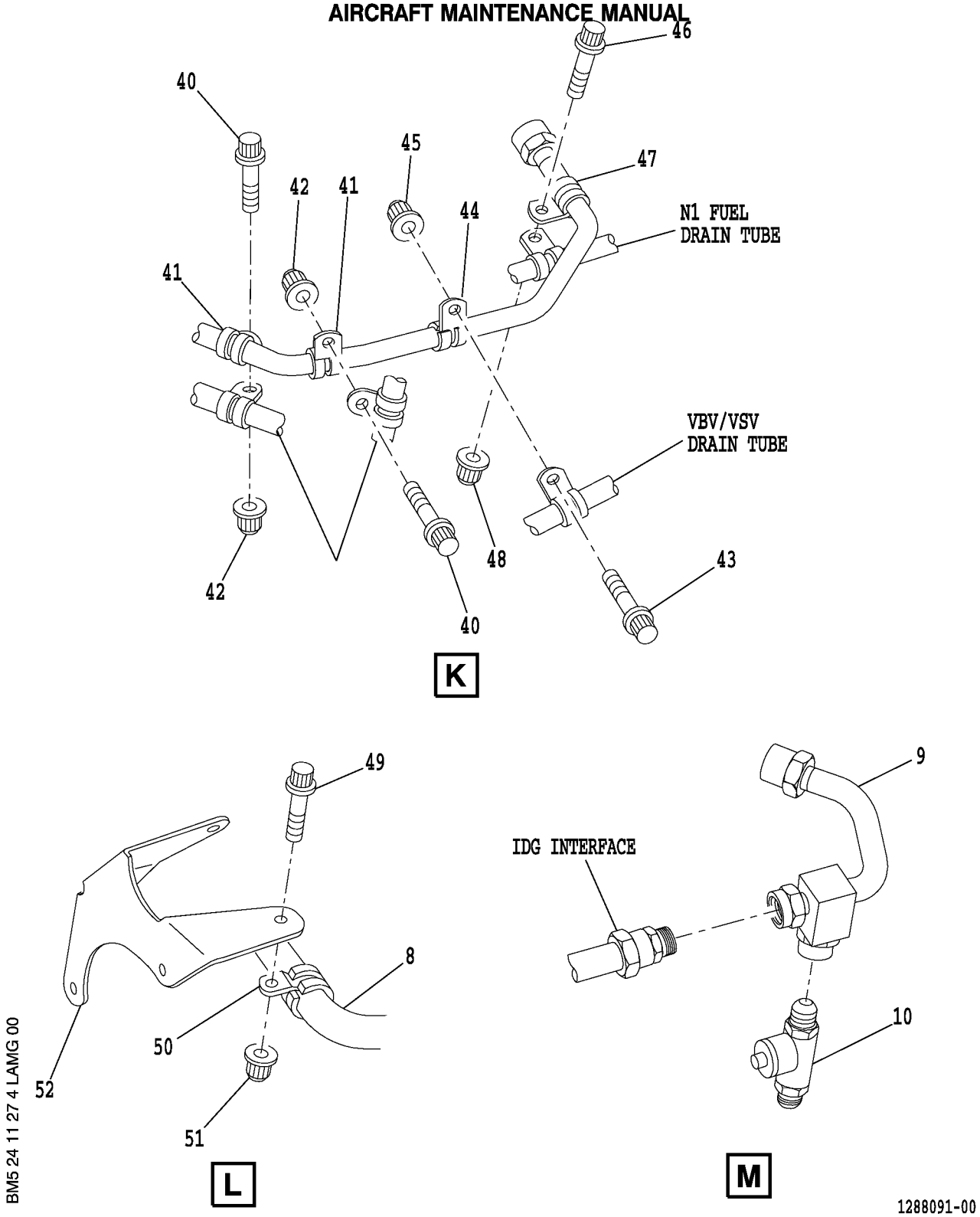
IDG Oil Tubing (Sheet 5/8)
Figure 402

R



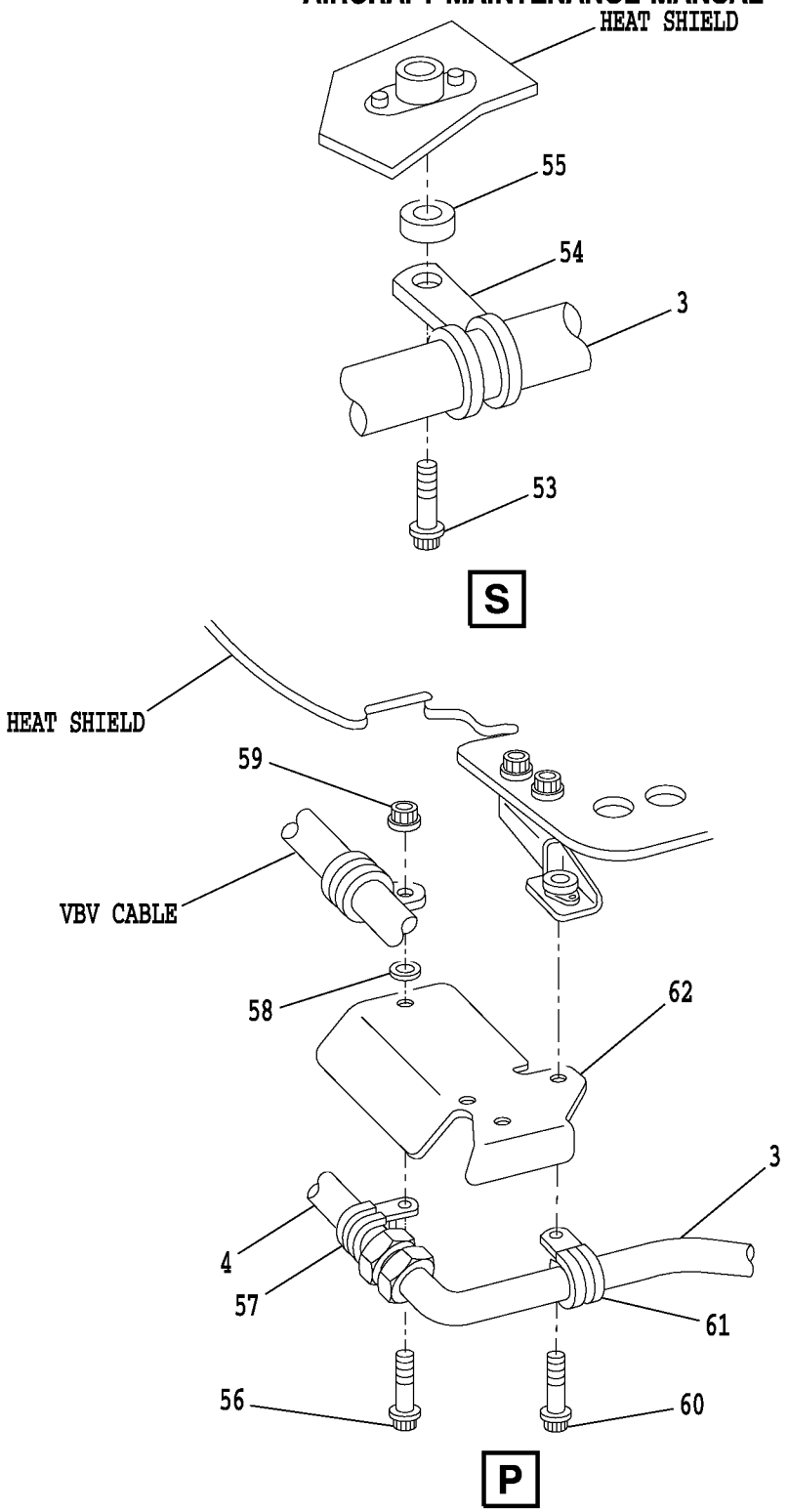
IDG Oil Tubing (Sheet 6/8)
Figure 402

R



IDG Oil Tubing (Sheet 7/8)
Figure 402

R



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IDG Oil Tubing (Sheet 8/8)
Figure 402

R

OIL COOLING (IDG) TUBING - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Packings
C.	Protective Covers
D.	Warning Notice
Referenced Procedures	
- 12-13-24, P. Block 1	Electrical Power (IDG Oil System)
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)On the FIRE control module (overhead panel) of the engine concerned, pull the fire handle and install a warning notice to prohibit actuation in normal position (pushed) while maintenance is in progress.

(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFRT/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V81

(3)Open the fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

B. Remove Oil Cooling (IDG) Tubing (Ref. Fig. 401)

NOTE : Place protective covers on open ports and drain tubes when opened or removed.

WARNING : BE CAREFUL WHEN DISCONNECTING OIL LINES OR DRAINING OIL FROM AN ENGINE THAT HAS RECENTLY BEEN RUNNING. HOT OIL CAN CAUSE SERIOUS INJURY TO EYES AND SEVERELY BURN SKIN.

(1)Place oil container under appropriate port or tube.

(2)Remove double clamp assembly (7) that secures tubes (1) and (2) to each other.

(3)Disconnect and remove tube (1) from reducer (3) and tube (12).

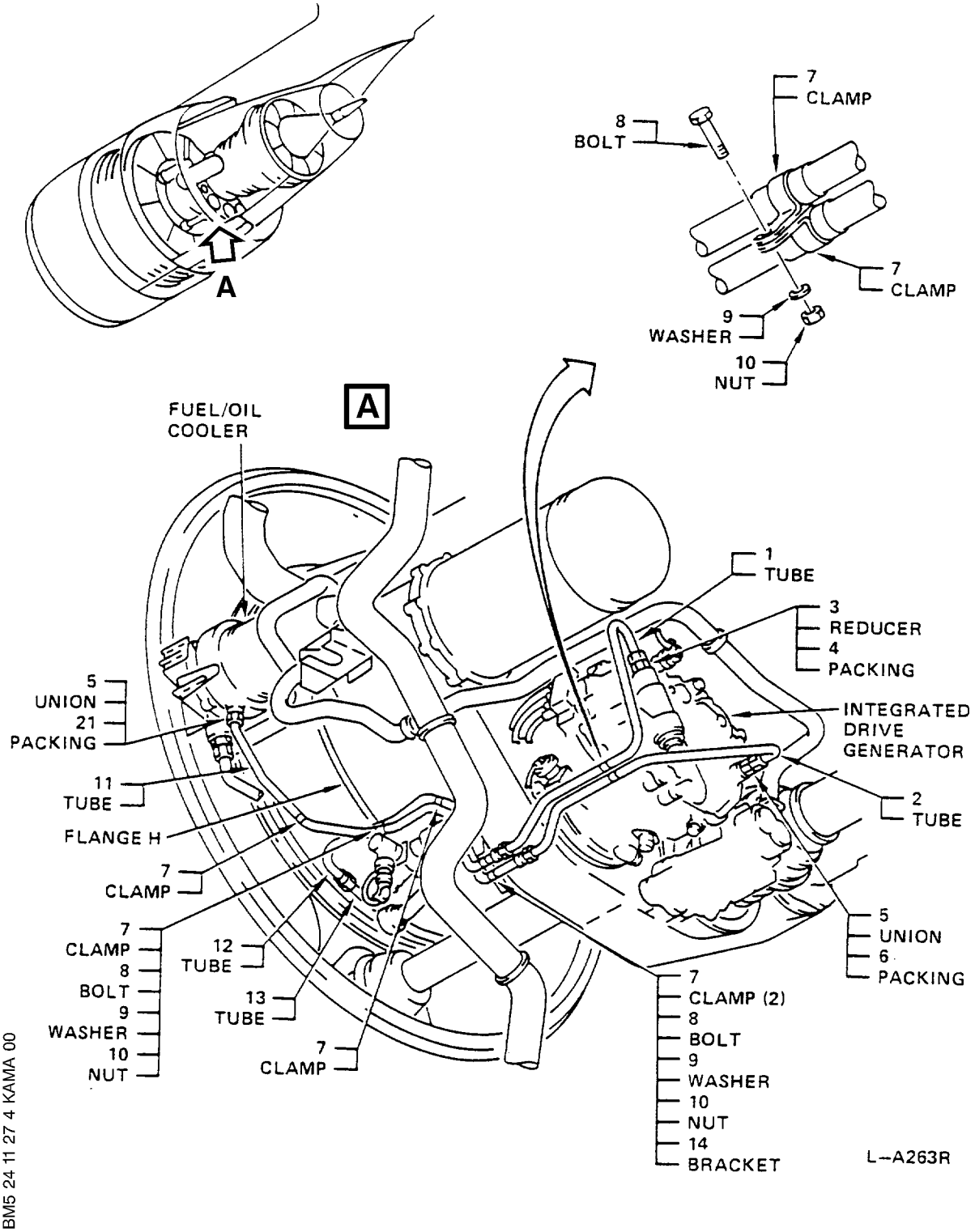
(4)Remove reducer (3) from integrated drive generator and discard packing.

(5)Disconnect and remove tube (2) from union (5) and tube (11).

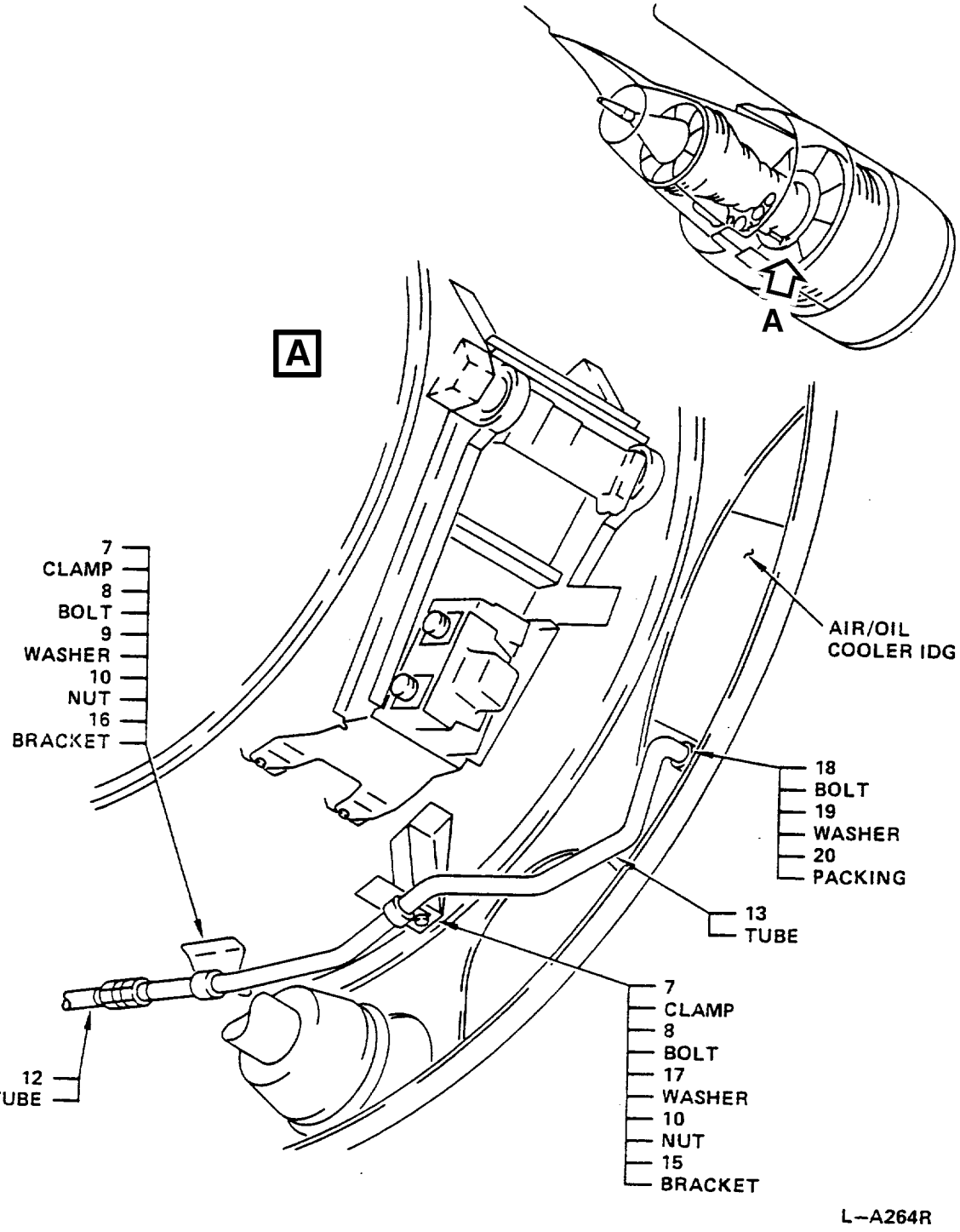
(6)On bracket (14), remove individual clamps (7) from tube (12) and tube (11).

(7)On tube (12), remove clamp (7) that secures electrical cable 21W4072 routed to DV213.

(8)On tube (11), remove clamp (7) that holds electrical cable 21W4072



Oil Cooling Tubing (Sheet 1/2)
Figure 401



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Oil Cooling Tubing (Sheet 2/2)
Figure 401

routed to DV213.
(9)On Flange H bracket, remove double clamp (7) from tube (11) and tube (12).
(10)Remove tube (12) from tube (13).
(11)On fuel/oil cooler, at IDG OIL-OUT port, disconnect and remove tube (11) from union (5).
(12)Remove union (5) from fuel/oil cooler, IDG OIL-OUT port and discard packing.
(13)Remove clamp (7) from bracket (16).
(14)On bracket (15), remove clamp (7) from tube (13), and temporarily replace bolt (8), washer (17) and nut (10) to hold engine drain tube clamp on top of bracket (15).
(15)At the IDG air/oil cooler port, remove three bolts (18) and washers (19). Remove tube (13) and discard packing (20).
(16)Verify that protective covers have been placed over all open ports and tubes.

C. Install Oil Cooling (IDG) Tubing (Ref. Fig. 401)
CAUTION : INSTALL DRAIN TUBES, FITTINGS AND CLAMPS FINGERTIGHT UNTIL FINAL ALIGNMENT HAS BEEN COMPLETED OR DAMAGE TO EQUIPMENT CAN OCCUR.
(1)Remove all protective covers.
(2)Position packing (21) to union (5), install in fuel/oil cooler IDG OIL-OUT port. TORQUE union (5) to 1,000 lbf.in (11.29 m.daN).
(3)Position packing (4) on reducer (3) and install in IDG OIL-OUT port. TORQUE reducer to 1,000 lbf.in (11.29 m.daN).
(4)Position packing (6) on union (5) and install in IDG OIL-IN port. TORQUE union to 1,000 lbf.in (11.29 m.daN).
(5)Connect tube (1) fingertight to reducer (3) at IDG OIL-OUT port.
(6)Position packing (20) and washer (19) on tube (13) and install with three bolts (18) fingertight on air/oil cooler IDG port.
(7)Connect tube (12) fingertight to tubes (13) and (1), and verify that tubes (1), (12) and (13) are correctly aligned.
(8)Connect tube (2) fingertight to union (5) at OIL-IN port on IDG.
(9)Connect tube (11) fingertight to union (5) on fuel-oil cooler IDG OIL-OUT port.
(10)Connect tube (2) to tube (11) and verify that these tubes are correctly aligned.
(11)Install clamp assemblies fingertight on tube (2).
(a)Install clamp sleeve on tube (2), center between tube bends and lock by pressing closed.
(b)Position clamp (7) on clamp sleeve. See detailed insert (Ref. Fig. 401) (Sheet 1/2)
(12)Install clamp assemblies fingertight on tube (11).
(a)Install clamp sleeve on tube (11), center on bracket (14) and lock by pressing closed.
(b)Position clamp (7) around clamp sleeve and align bolt hole of clamp to bolt hole of bracket (14).
(c)Fasten clamp fingertight with bolt (8), washer (9) and nut (10).
(d)Install clamp sleeve on tube (11), center on Flange H bracket and lock by pressing closed.

(e)Align bolt hole on clamp (7) to bolt hole on Flange H bracket and install bolt several turns to hold clamp in position.
(f)Install clamp sleeve on tube (11), position at cable 21W4072 and lock by pressing closed.
(g)Align bolt hole of clamp (7) to bolt hole of cable clamp, install on tube (11) and fasten fingertight with bolt (8), washer (9) and nut (10).

(13)Install clamp assemblies fingertight on tube (1).
(a)Install clamp sleeve on tube (1), center on clamp sleeve previously installed on tube (2) and lock by pressing closed.
(b)Install clamp (7) to align with clamp (7) previously installed on tube (2). See detailed insert (Ref. Fig. 401) (Sheet 2/2).
(c)Fasten both clamps fingertight with bolt (8), washer (9) and nut (10).

(14)Install clamp assemblies fingertight on tube (12).
(a)Install clamp sleeve on tube (12), center on bracket (14) and lock by pressing closed.
(b)Position clamp (7) around clamp sleeve and align bolt hole of clamp to bolt hole of bracket.
(c)Fasten clamp fingertight with bolt (8), washer (9) and nut (10).
(d)Install clamp sleeve on tube (12), position at cable 21W4072 and lock by pressing closed.
(e)Align bolt hole of clamp (7) to bolt hole of cable clamp, install on tube (12) and fasten fingertight with bolt (8), washer (9) and nut (10).
(f)Install clamp sleeve on tube (12), center on Flange H bracket and lock by pressing closed.
(g)Remove bolt previously installed on Flange H bracket. Align bolt hole on clamp (7) to bolt hole on Flange H bracket and fasten both clamps on tubes (11) and (12) fingertight with bolt (8), washer (9) and nut (10).

(15)Install clamp assemblies fingertight on tube (13).
(a)Install clamp sleeve on tube (13), center on bracket (16) and lock by pressing closed.
(b)Align bolt hole of clamp (7) with bolt hole of bracket (16) and install fingertight with bolt (8), washer (9) and nut (10).
(c)Install clamp sleeve on tube (13), center on bracket (15) and lock by pressing closed.
(d)Align bolt hole of clamp (7) and bolt hole of bracket (16) and bolt hole of clamp fastening drain tube to top of bracket (16), and install both clamps fingertight with bolt (8), washer (9) and nut (10).

(16)Verify that tubes (1), (12) and (13), are correctly aligned.
(17)Verify that tubes (2) and (11) are correctly aligned.
(18)**TORQUE** tube (2) connector at union (5) and **OIL-IN** port of **IDG** to 1,000 lbf.in (11.29 m.daN).
(19)**TORQUE** tube (11) connector at union (5) on fuel/oil cooler to 1,000 lbf.in (11.29 m.daN).
(20)Verify that tubes (2) and (11) do not move and **TORQUE** tube (2) to tube (11) to 1,000 lbf.in (11.29 m.daN).
(21)**TORQUE** tube (1) connector at reducer (3) to 1,000 lbf.in (11.29 m.daN).
(22)At air/oil cooler **IDG** port, **TORQUE** bolts (18) on tube (13) to 70 lbf.in (0.79 m.daN).

(23)Verify that tube (12) does not move and TORQUE tube (1) and (13) connectors to 1,000 lbf.in (11.29 m.daN).
(24)TORQUE bolt (8) on clamp (7) at brackets (15), (16) and (14) and Flange H bracket to 25 lbf.in (0.28 m.daN).
(25)TORQUE bolt (8) at double clamp (7) on tubes (1) and (2) to 25 lbf.in (0.28 m.daN).
(26)TORQUE bolt (8) on bracket (14), tube (11) to 25 lbf.in (0.28 m.daN).
(27)TORQUE bolt (8) on tube (11) cable clamp (7) to 25 lbf.in (0.28 m.daN).
(28)TORQUE bolt (8) on tube (12) cable clamp (7) to 25 lbf.in (0.28 m.daN).

D. Close-Up
(1)Replenish IDG with oil (Ref. 12-13-24, P. Block 1).
(2)On the appropriate FIRE control module, push the fire handle and remove the warning notice.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers.

TERMINAL BLOCK ASSEMBLY - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1) Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

B. Removal

R (Ref. Fig. 401)

(1) Remove screws, washers and terminal block cover.

R (2) Remove captive nut/washer (32) or nut (30) and washer (31).

R (3) Remove aircraft wiring phase leads (26).

(4) Remove terminal block mounting screws.

(5) Remove terminal block from through lead straps by sliding it toward IDG input end.

R (6) Remove and retain generator terminal lead assembly from terminal block.

C. Installation (Ref. Fig. 401)

(1) Install square washers on terminal block.

R CAUTION : SQUARE WASHERS MUST BE POSITIONED BELOW THE THROUGH LEAD STRAPS. IMPROPERLY POSITIONED WASHERS WILL RESULT IN EXTREME HEATING AND DAMAGE TO INTEGRATED DRIVE GENERATOR.

(2) Install terminal block, making certain that square washers are positioned below through lead straps.

(3) Secure terminal block with screws. TORQUE screws to between 51 and 56 lbf.in. (0.57 and 0.63 m.daN).

R CAUTION : ROUND WASHER MUST BE INSTALLED BETWEEN TERMINAL NUTS AND PHASE LEADS. DO NOT INSTALL ANY WASHERS UNDER PHASE LEADS. LOCALIZED RESISTANCE HEATING AND BURNING OF TERMINAL BLOCK WILL RESULT.

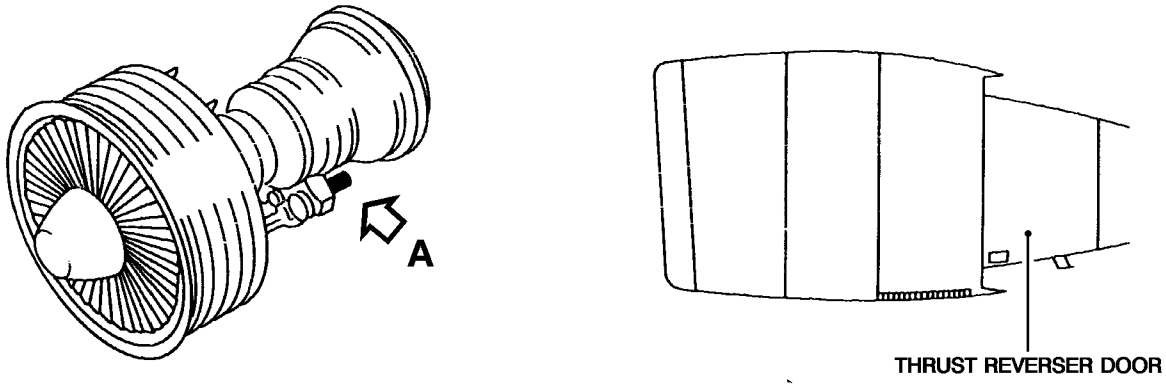
R (4) Install generator terminal lead assembly and phase leads (26) to IDG terminal block by matching N, T1, T2, T3 wire labels with corresponding
R terminal labels (Ref. Fig. 401).

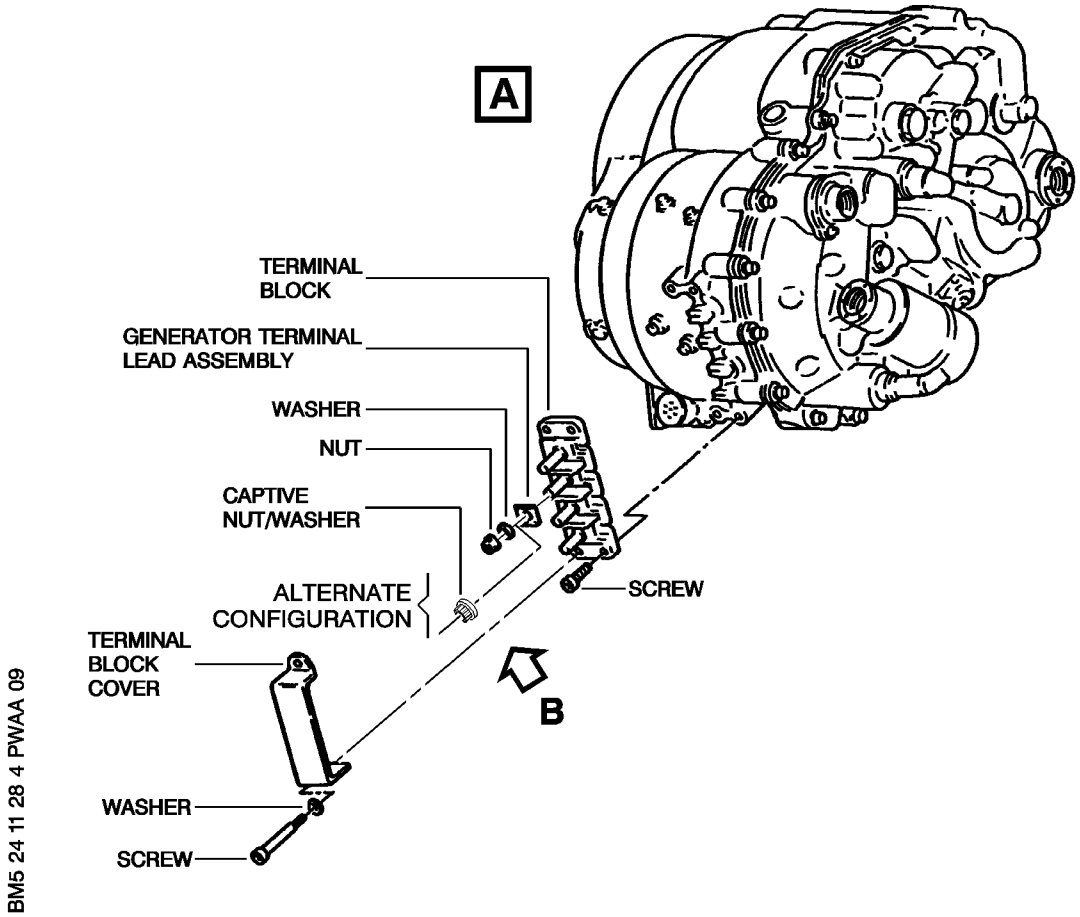
R (5) Install captive nut/washer (32) or washer (31) and nut (30). TORQUE
R captive nut/washer or nut 144 and 168 lbf.in. (1.63 and 1.90 m.daN).

(6) Install terminal block cover and secure with washers and screws. TORQUE screws 20 and 22 lbf.in. (0.23 to 0.25 m.daN).

D. Close-Up

(1) Remove safety clips and tags and close circuit breakers. Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).



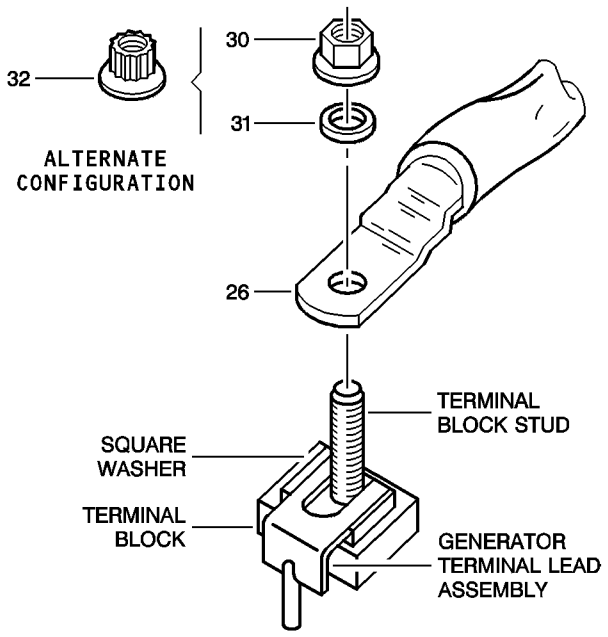


IDG - Terminal Block Assembly (Sheet 1/2)
Figure 401

R

B

PHASE LEAD INSTALLATION



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IDG - Phase Lead Installation (Sheet 2/2)
Figure 401

R

E. Test
(1)At first engine start, check correct power supply of the electrical network.

TERMINAL BLOCK ASSEMBLY - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser and fan cowl door (Ref. 71-13-00, P. Block 301).

B. Removal
(Ref. Fig. 401)

(1)Remove screws, washers and terminal block cover.
(2)Remove captive nut/washer or nut and washer.
(3)Remove aircraft wiring phase leads.
(4)Remove terminal block mounting screws.
(5)Remove terminal block from through lead straps by sliding it toward IDG input end.
(6)Remove and retain square washers from terminal block.

C. Installation

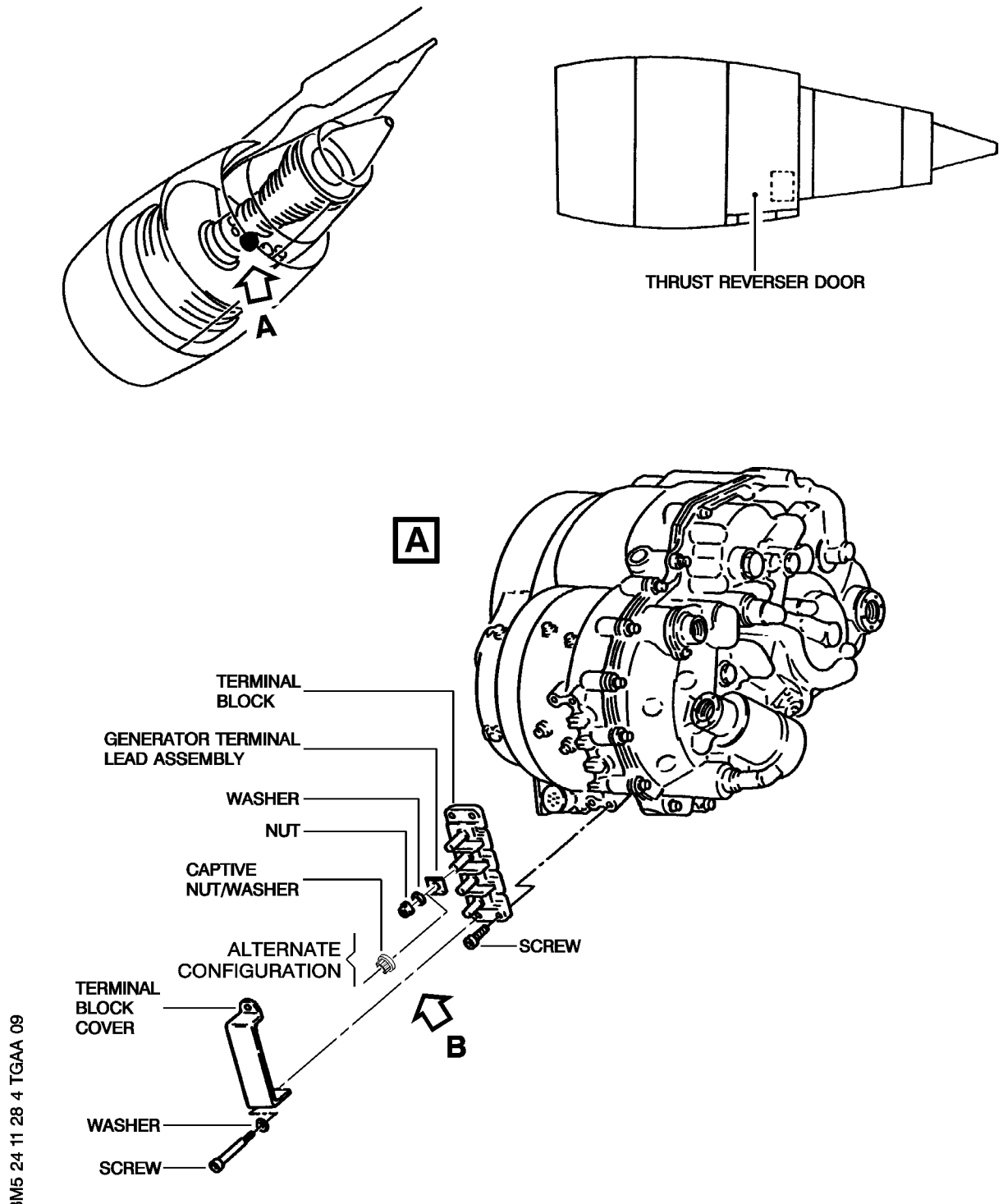
(1)Install square washers on terminal block.

CAUTION : SQUARE WASHERS MUST BE POSITIONED BELOW THE THROUGH LEAD STRAPS. IMPROPERLY POSITIONED WASHERS WILL RESULT IN EXTREME HEATING AND DAMAGE TO INTEGRATED DRIVE GENERATOR.

(2)Install terminal block, making certain that square washers are positioned below through lead straps.
(3)Secure terminal block with screws. TORQUE screws to between 51 and 56 lbf.in. (0.57 and 0.63 m.daN).

CAUTION : ROUND WASHER MUST BE INSTALLED BETWEEN TERMINAL NUTS AND PHASE LEADS. DO NOT INSTALL ANY WASHERS UNDER PHASE LEADS. LOCALIZED RESISTANCE HEATING AND BURNING OF TERMINAL BLOCK WILL RESULT.

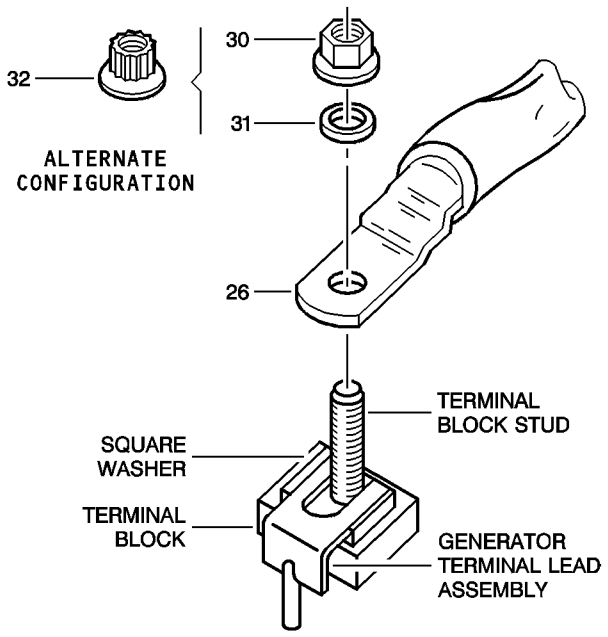
(4)Install generator terminal lead assembly and phase leads (26) to IDG terminal block by matching N, T1, T2, T3 wire labels with corresponding terminal labels.
(5)Install captive nut/washer (32) or washer (31) and nut (30). Torque captive nut/washer or nut to between 144 and 168 lbf.in. (1.63 and 1.90 m.daN) (Ref. Fig. 401).
(6)Install terminal block cover and secure with washers and screws. TORQUE screws 20 and 22 lbf.in. (0.23 to 0.25 m.daN).



IDG - Terminal Block Assembly (Sheet 1/2)
Figure 401

B

PHASE LEAD INSTALLATION



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IDG - Phase Lead Installation (Sheet 2/2)
Figure 401

D. Close-Up
(1)Remove safety clips and tags and close circuit breakers. Close left thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

E. Test
(1)At first engine start, check correct power supply of the electrical network.

IDG AIR/OIL HEAT EXCHANGER VALVE OVERRIDE PRESSURE SWITCH - REMOVAL/INSTALLATION

1. Prerequisites

A. Remove the fan exit liner segment (inner rear) that is at 1 o'clock (Refer to 72-34-03, P. Block 401).

2. Equipment and Materials

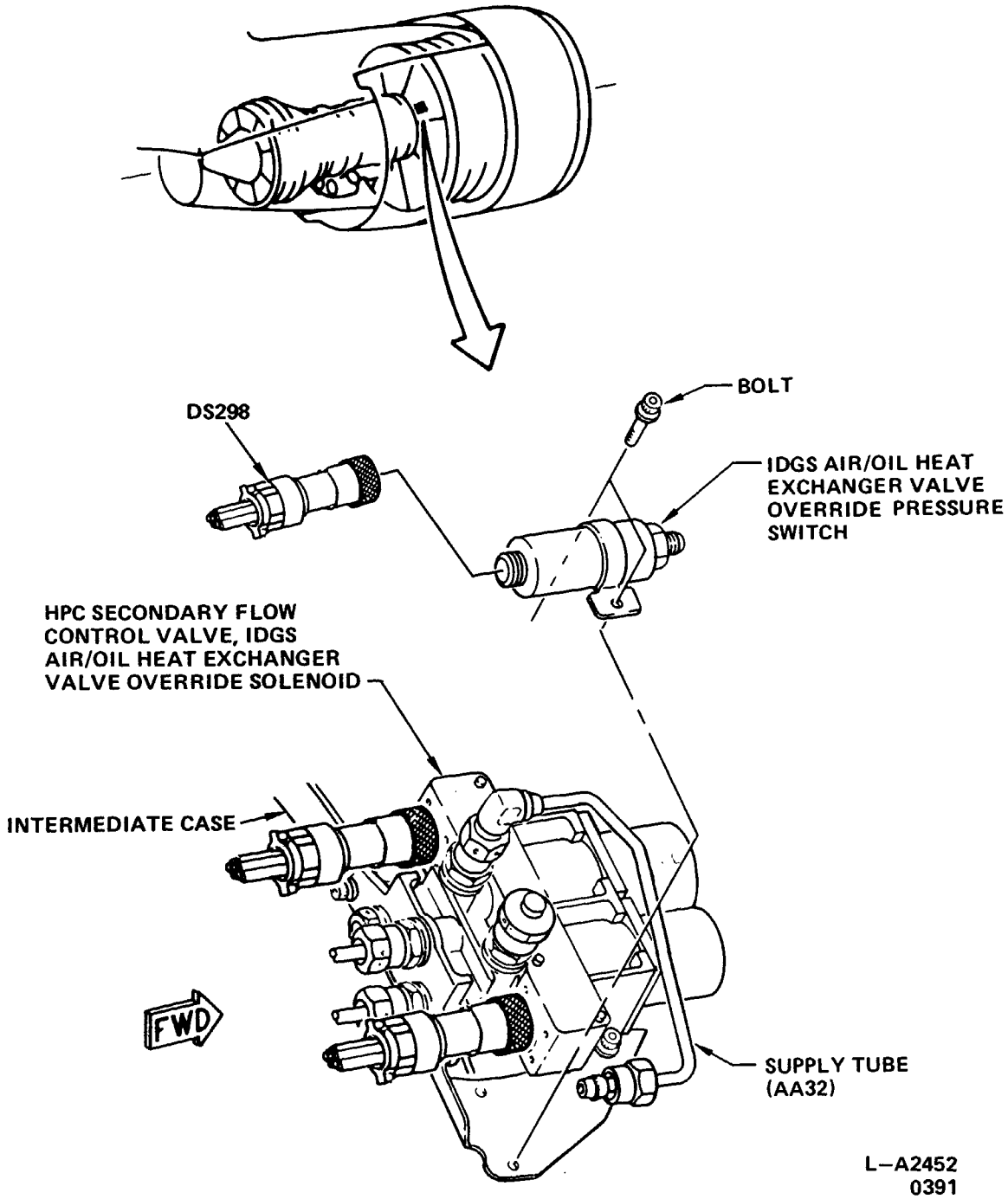
ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench
C.	Bergen Mechanical Crimper (Optional) Model M303, M305 or M307
D. Material No.P03-001	Oils (Ref. 70-00-00)
E. Material No.P05-289	Special Materials (Ref. 70-00-00)
F. Material No.P05-291	Special Materials (Ref. 70-00-00)
G. Material No.P05-292	Special Materials (Ref. 70-00-00)
H. Material No.P06-003	Lubricants (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 72-23-05, P. Block 401	Fan Exit Liner Segments

3. Procedure

A. Job Set-Up
(1)Open, safety and tag circuit breakers for the appropriate engine and open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connector DS298 from rear of switch.
(2)Remove lockwire and disconnect tube (AA32) from front of switch.
(3)Remove two bolts securing switch to bracket and remove switch from engine.
(4)Install protective closures.

C. Installation (Ref. Fig. 401)
(1)Remove protective closures.
(2)Position switch to bracket, at approximately 1 o'clock position on intermediate case, with electrical connector rearward. Secure in place with two bolts, threads lubricated with Engine Oil (Material No.P03-001) and TORQUE to between 36 and 40 lbf.in. (0.41 and 0.45 m.daN).
(3)Lubricate adapter threads with Antigalling Compound (Material No.P06-003) and install tube nut (AA32). TORQUE tube nut to between 65 and 75 lbf.in. (0.73 and 0.85 m.daN). Secure with Lockwire (Material No.P05-289) or Safety Cable (Material No.P05-291) and Safety Cable Ferrule (Material No.P05-292).



IDG Air/Oil Heat Exchanger Valve Override Pressure Switch
Figure 401

CAUTION : USE THE CORRECT ASSEMBLY PROCEDURE AND TOOLS FOR THE HARNESS CONNECTOR INSTALLATION (REF. 70-00-00, P. BLOCK 201). IF YOU USE THE INCORRECT ASSEMBLY PROCEDURE OR TOOLS, A DAMAGED OR LOOSE CONNECTOR CAN OCCUR. A LOOSE CONNECTOR PERMITS VIBRATION, WHICH CAN CAUSE THE CONTACTS TO WEAR AND UNSATISFACTORY LIGHTNING PROTECTION.

(4)Connect electrical connector DS298 to rear of switch.

D. Postrequisites

(1)Install the fan exit liner segment (inner rear) that you removed. (Refer to 72-34-03, P. Block 401).

E. Close-Up

(1)Remove safety clips and tags and close circuit breakers. Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).

IDG AIR SHUT-OFF VALVE FILTER - MAINTENANCE PRACTICES

1. Reason for the Job

This procedure gives the instructions to remove, install and clean the filter that is in-line with the 11th stage pneumatic pressure supply.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Torque Wrench
C.	1/4 in. Allen Wrench
D.	Protective Cover
E. Material No.C02-023	Anti-Seize Compounds, Lubricants Oils (Ref. 70-00-00)
F. Material No.C04-002	Cleaning Compounds and Solvents (Ref. 70-00-00)
Referenced Procedures	
- 70-00-00, P. Block 201	Standard Practices
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure

A. Job Set-up

WARNING : TAKE PRECAUTIONARY MEASURES IF THE IDG HAS BEEN IN OPERATION RECENTLY. CHECK OIL TEMPERATURE AND LET IT COOL IF NECESSARY.

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DISC/IDG1	3XT	206/D20
22VU	ELEC/DISC/IDG2	4XT	206/D21
133VU	ELEC/GEN1/COOL VALVE	1XT	332/U80
133VU	ELEC/GEN2/COOL VALVE	2XT	331/V80
133VU	ELEC/XFR1/CNTOR CTL	15XU	332/U81
133VU	ELEC/GEN2/GCU/BACK UP/SUPPLY	18XU	331/V80

(2)Open, safety and tag circuit breakers for the appropriate engine, and open right fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).

(3)On IDG, press vent valve first to remove internal pressure from oil system.

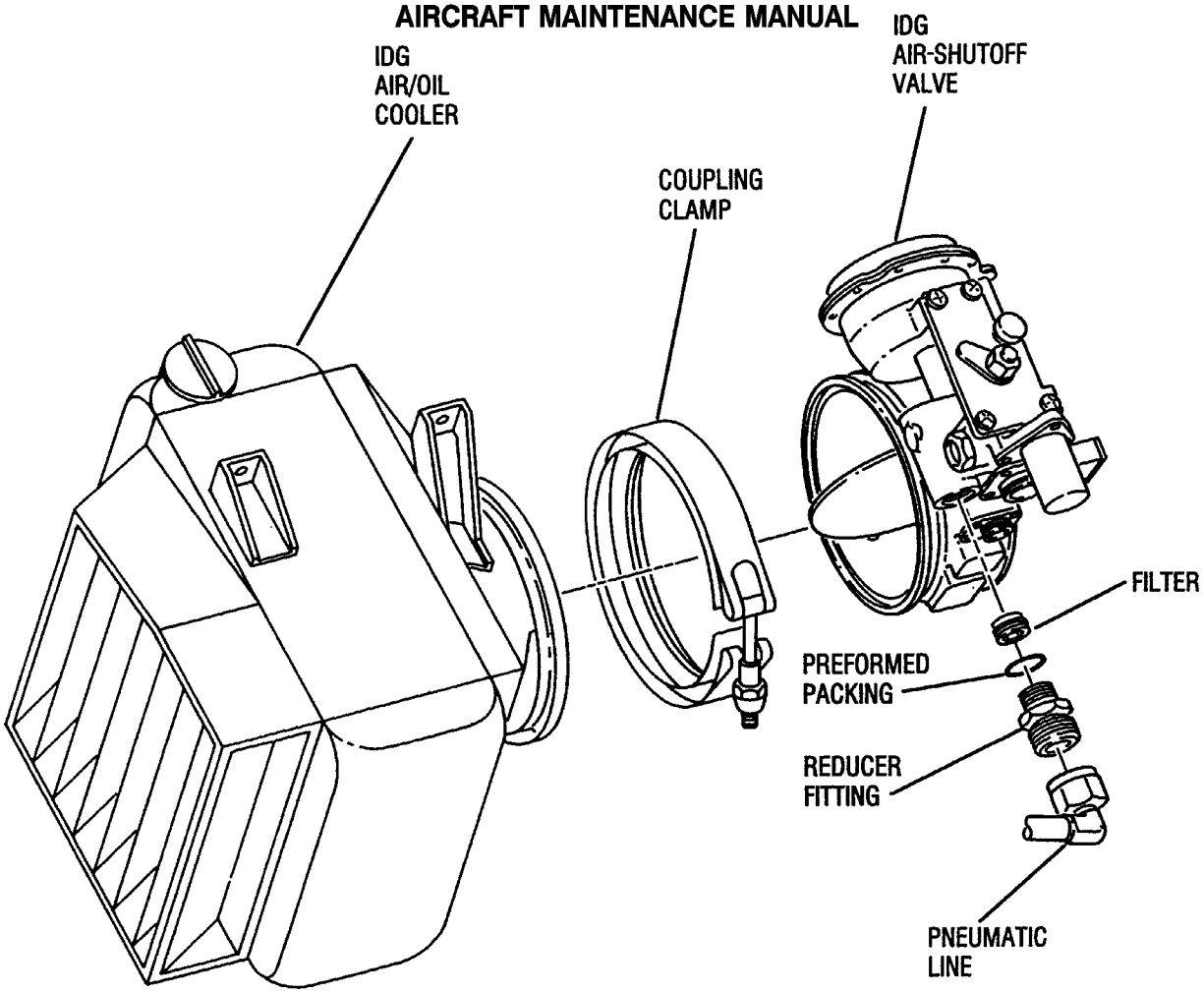
B. Removal

(Ref. Fig. 201)

(1)Disconnect the 11th stage pneumatic line from the valve. Put a cover on the pneumatic line.

(2)Remove the fitting from the valve. Discard preformed packing and keep fitting.

(3)Install a 1/4 inch allen wrench in the recess port of the valve and



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IDG Air Shut-Off Valve Filter
Figure 201

remove the filter.

C. Inspection and Cleaning
(1)Blow out the filter with dry compressed air and clean with solvent Material No.C04-002. Dry filter with dry compressed air.
(2)Make sure that light can go through the screen of the filter.
NOTE : If filter is damaged (bent, crushed or torn screen) or cannot be cleaned, replace with new filter.

D. Installation
CAUTION : DO NOT OPERATE THE VALVE WITHOUT THE FILTER INSTALLED.
(1)Use a 1/4 inch allen wrench and install the filter in the recess port of the valve. Tighten the filter until it stops.
(2)Lubricate the preformed packing with oil Material No.C02-023 and install on the fitting.
(3)Install the fitting in the pneumatic port of the valve. TORQUE the fitting to between 155 and 175 lbf.in. (1.75 and 1.98 m.daN).
(4)Remove the cover from the pneumatic line. Connect the pneumatic line to the valve fitting and TORQUE the coupling nut to between 270 and 300 lbf.in. (3.05 and 3.39 m.daN).

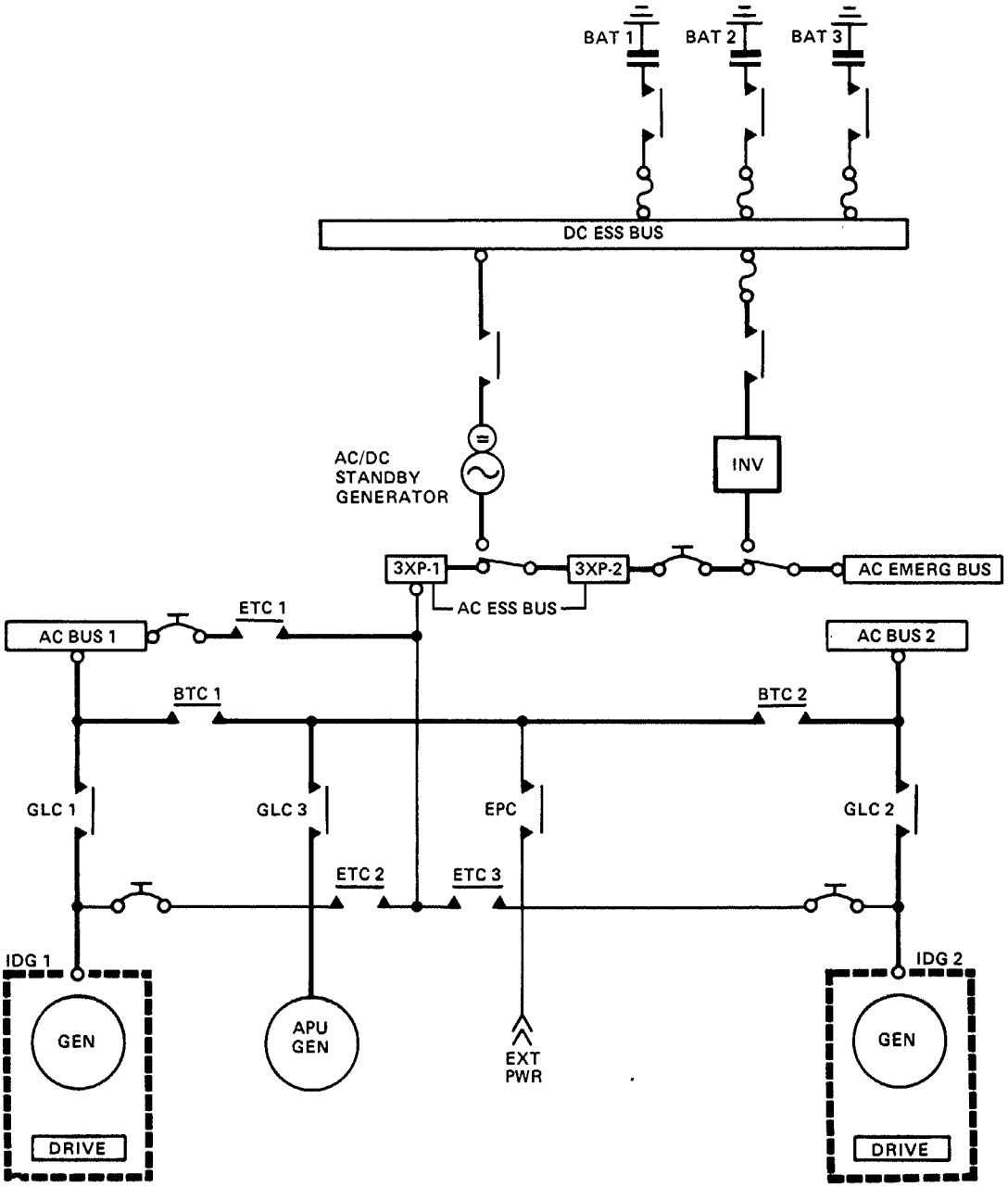
E. Close-up
(1)Remove safety clips and tags and close circuit breakers and close right fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove safety clips and tags and close circuit breakers 1XT, 2XT, 3XT, 4XT, 15XU and 18XU.

AC GENERATION

The AC generation is comprised of the onboard electrical power supply sources, the distribution networks monitoring and switching circuits.
It consists in : (Ref. Fig. 001)

- a main generation corresponding to the two IDGs channels and to the transfer circuit (Ref. 24-22-00, P. Block 1)
- an auxiliary generation corresponding to the APU generator (Ref. 24-23-00, P. Block 1)
- an emergency generation (Ref. 24-24-00, P. Block 1) corresponding either to an AC/DC standby generator or to a static inverter.
- control circuits for selection of the essential network supply and shedding of the distribution (Ref. 24-25-00, P. Block 1)
- control circuits for galley supply (Ref. 24-26-00, P. Block 1)
- monitoring and indicating circuits for the flight compartment (Ref. 24-27-00, P. Block 1).

The figure shows the AC generation main component location (Ref. Fig. 002).



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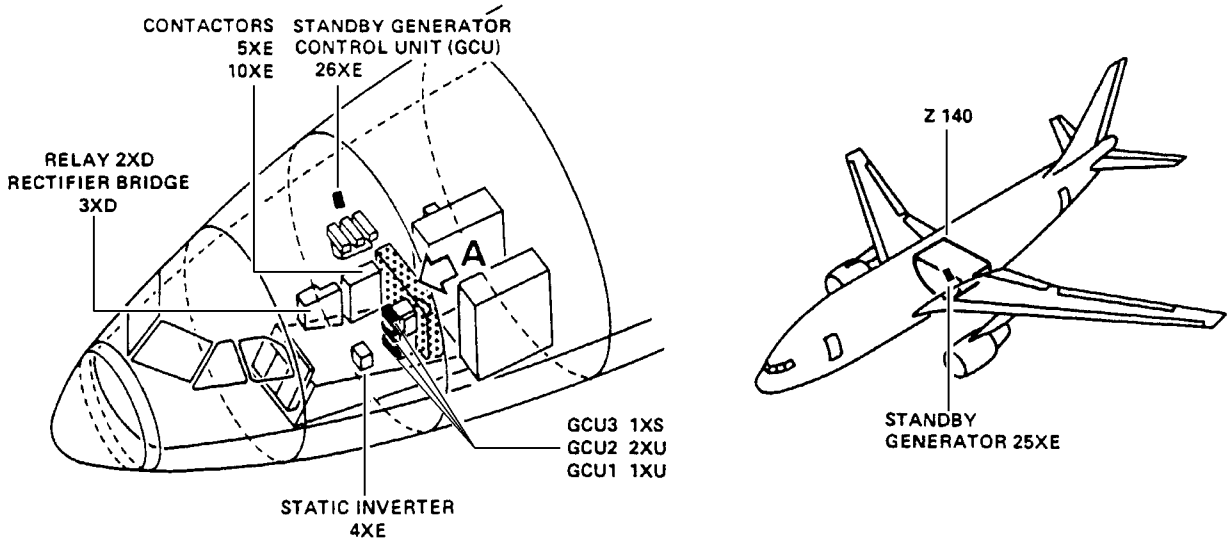
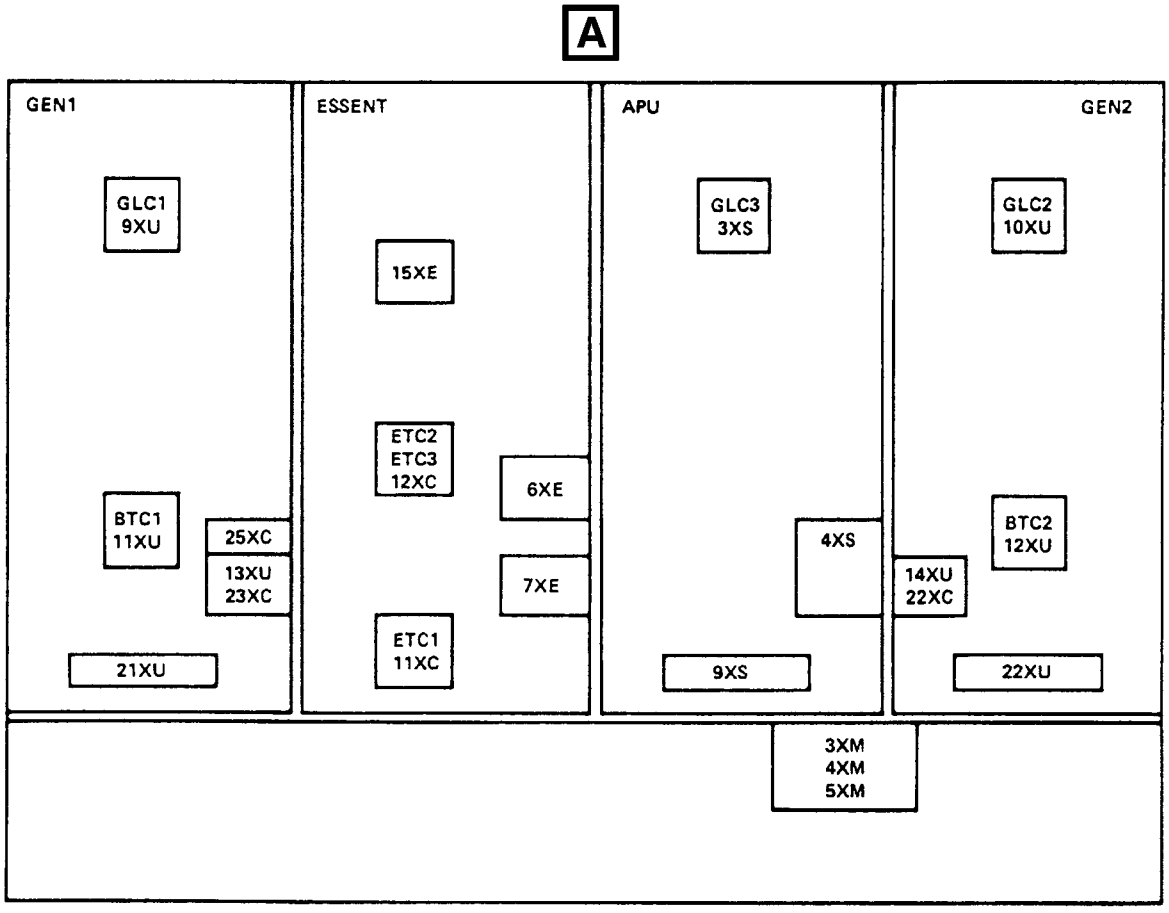
DM5

AC Generation
Figure 001





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AC Generation - Component Location
Figure 002

Ref. : MMEL Sect. 1-24, Item 1 (Engine driven generator channels (IDG, GCU, line contactors))

1. Deactivation

A. Reason for the Job

Isolate the faulty portion in order to keep the electrical network power supply.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-23-00, P. Block 301	Auxiliary AC Generation

C. Procedure

(1)Preparation

(a)Power supply aircraft electrical network by the APU (Ref. 24-23-00, P. Block 301).

(b)Activate the ECAM.

(2)Deactivation

(a)On panel 424VU

- make certain that the appropriate GEN pushbutton switch is released out (OFF legend on).

(b)Make certain that the corresponding IDG is disconnected, if the failure has been caused by the IDG only.

NOTE : To be sure that the corresponding IDG 1(2) is disconnected, with the aircraft on the ground, on the GPCU, press the FAULT ISOLATE pushbutton switch.
All failures occurred during the last flight will be displayed on the GPCU display window.

(3)Test

ACTION	RESULT
(a)On the ECAM system - call ELEC AC page	On the ECAM system - check supply of the whole alternating current network
- call ELEC DC page	- check supply of the whole direct current network.
(b)On panel 425VU - place AC parameter selector switch successively in BUS and APU GEN positions	On panel 425VU - check frequency, voltage and load on indicators.
- place DC parameter selector switch successively in all the positions.	- check voltage and amperage on indicators.

(4)Close-up
(a)De-energize the aircraft electrical network and shut down the APU (Ref. 24-23-00, P. Block 301).

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz, 90 KVA
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

B. Procedure

CAUTION : IF THE IDG IS OPERATED FOR 50 HOURS IN THE DISCONNECTED MODE WITHOUT RECONNECTING, REMOVE THE IDG FOR SHOP INSPECTION OF THE INPUT SHAFT BALL BEARING ASSEMBLY.

(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Reactivation
(a)Refer to AMM 24-11-00, P. Block 501.
(3)Close-up
(a)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

MAIN AC GENERATION

1. General

The main AC generation is provided by both engine generators. It enables the whole aircraft to be supplied in normal flight configuration.
The transfer circuit enables either or both distribution network(s), to be supplied from any main auxiliary or ground generation source.

2. Component Location

(Ref. Fig. 001)

R **ON A/C 001-100,

(Ref. Fig. 002)

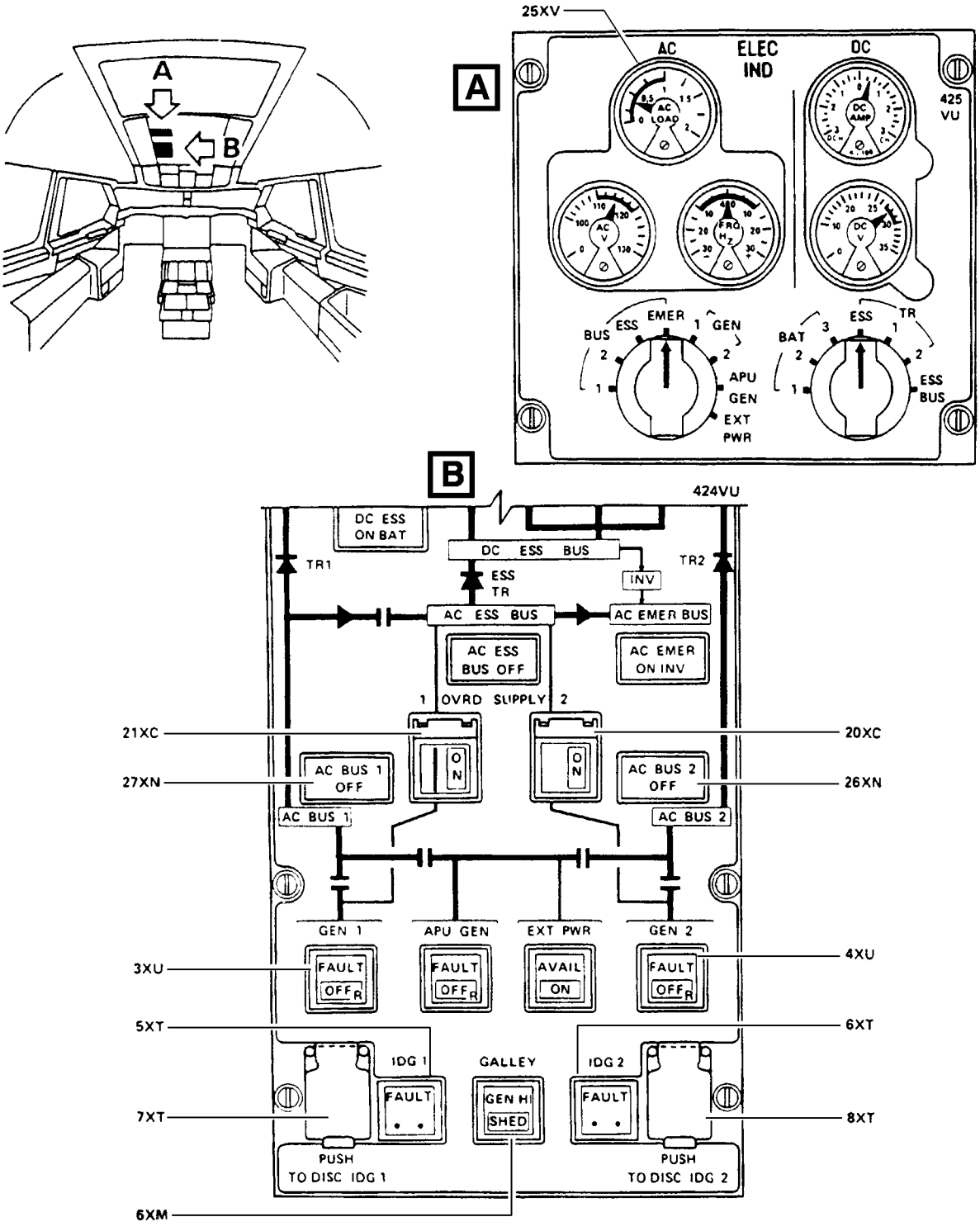
R **ON A/C 101-200,

(Ref. Fig. 003)

R **ON A/C ALL

(Ref. Fig. 004)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
20XC	P/BSW - ELEC PWR/OVRD SUPPLY 2	424VU	211		24-25-00
21XC	P/BSW - ELEC PWR/OVRD SUPPLY 1	424VU	211		24-25-00
3XG	CNTOR - AC EXT PWR	101VU	121	121BL	24-41-12
7XG	GPCU	81VU	121	121BL	24-41-11
6BM	P/BSW - ELEC PWR/GALLEY	424VU	211		24-26-00
1XS	GCU - APU	101VU	121	121BL	24-23-12
3XS	CNTOR - APU GEN PWR LINE	101VU	121	121BL	24-23-13
5XT	WARNING LIGHT - ELEC PWR/IDG 1	424VU	211		24-11-00
6XT	WARNING LIGHT - ELEC PWR/IDG 2	424VU	211		24-11-00
7XT	P/BSW - ELEC PWR/PUSH TO DISC IDG 1	424VU	211		24-11-00
8XT	P/BSW - ELEC PWR/PUSH TO DISC IDG 2	424VU	211		24-11-00
1XU	GCU - GEN 1		121	121BL	24-22-12
2XU	GCU - GEN 2		121	121BL	24-22-12
3XU	P/BSW - ELEC PWR/GEN 1	424VU	211		24-22-00
4XU	P/BSW - ELEC PWR/GEN 2	424VU	211		24-22-00
9XU	CNTOR - GEN 1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR - GEN 2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR - TRANSFER, SYS 1	101VU	121	121BL	24-22-18
12XU	CNTOR - TRANSFER, SYS 2	101VU	121	121BL	24-22-18
21XU	CURRENT TRANSFORMER - GEN 1	101VU	121	121BL	24-22-00
22XU	CURRENT TRANSFORMER - GEN 2	101VU	121	121BL	24-22-00
26XN	WARNING LIGHT - ELEC PWR/AC BUS 2 OFF	424VU	211		24-22-00
27XN	WARNING LIGHT - ELEC PWR/AC BUS 1 OFF	424VU	211		24-22-00
25XV	LOADMETER - AC	425VU	211		24-27-00
24R001	IDG - 1		456	451AL	24-11-00
24L002	IDG - 2		465	461AL	24-11-00



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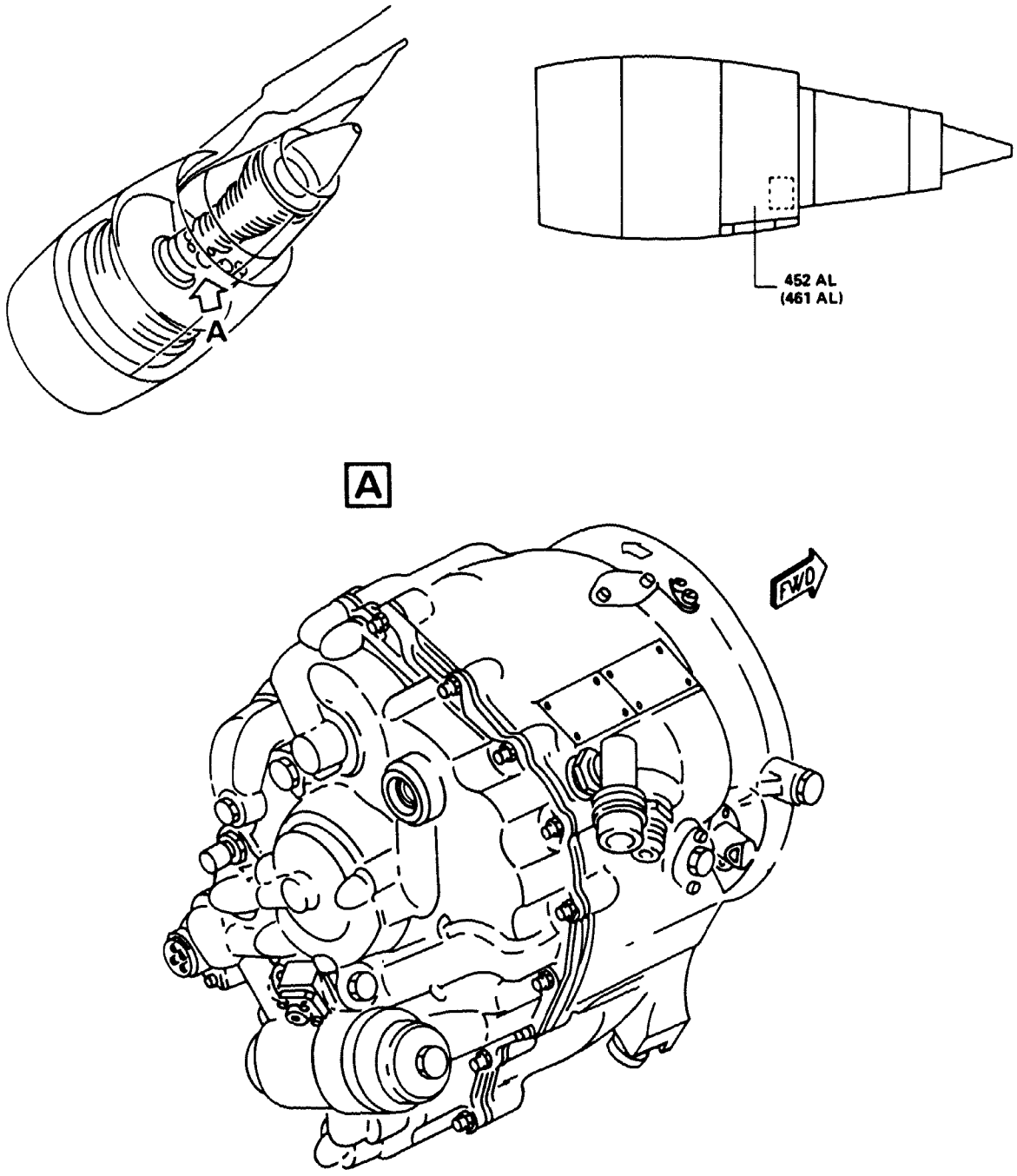
Controls and Indicating - Location
Figure 001

R



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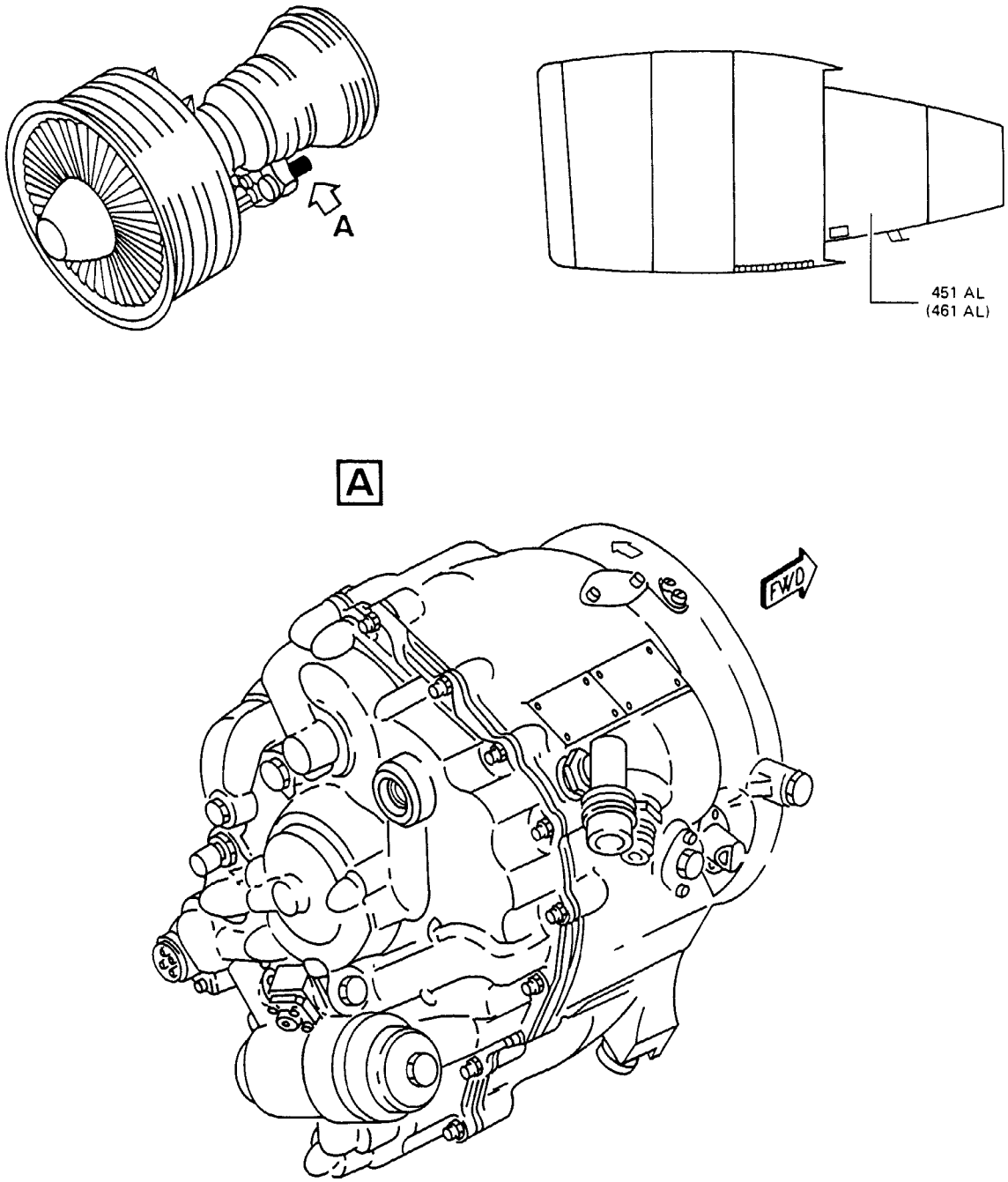
IDG - Location
Figure 002



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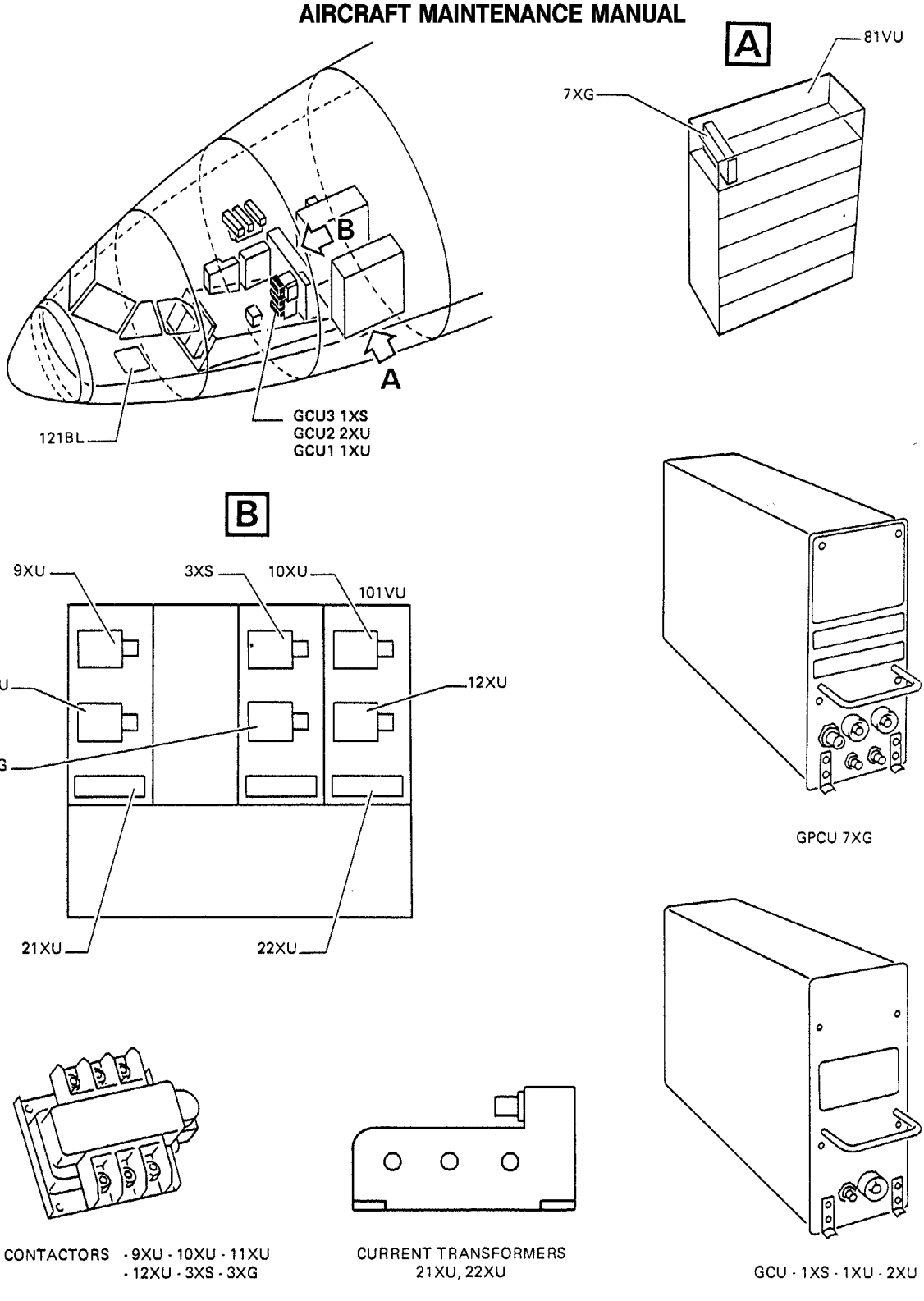
IDG - Location
Figure 003



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Component Location in Avionics Compartment
Figure 004

3. Main Generation by Engine AC Generator

The IDG generator driven at constant speed, is a conventional, 3-coaxial component brushless generator :
- PMG (Permanent Magnet Generator)
- a rotating diode pilot exciter,
- finally the generator itself

It is cooled by oil spraying. Each generator is associated with a generator control unit (GCU), the function of which is to :
- regulate the network voltage
- control the generator while protecting the network and the generator
- control the different warnings and indications

Moreover, the GCU is fitted with a built-in test equipment (BITE) which enables maintenance operations on the system to be facilitated.

A. Control and Indicating Circuits

Controls and indications for each generator are located on the overhead panel main segment in the flight compartment, and are transmitted via the GCU.

(1) Controls and indications in the flight compartment

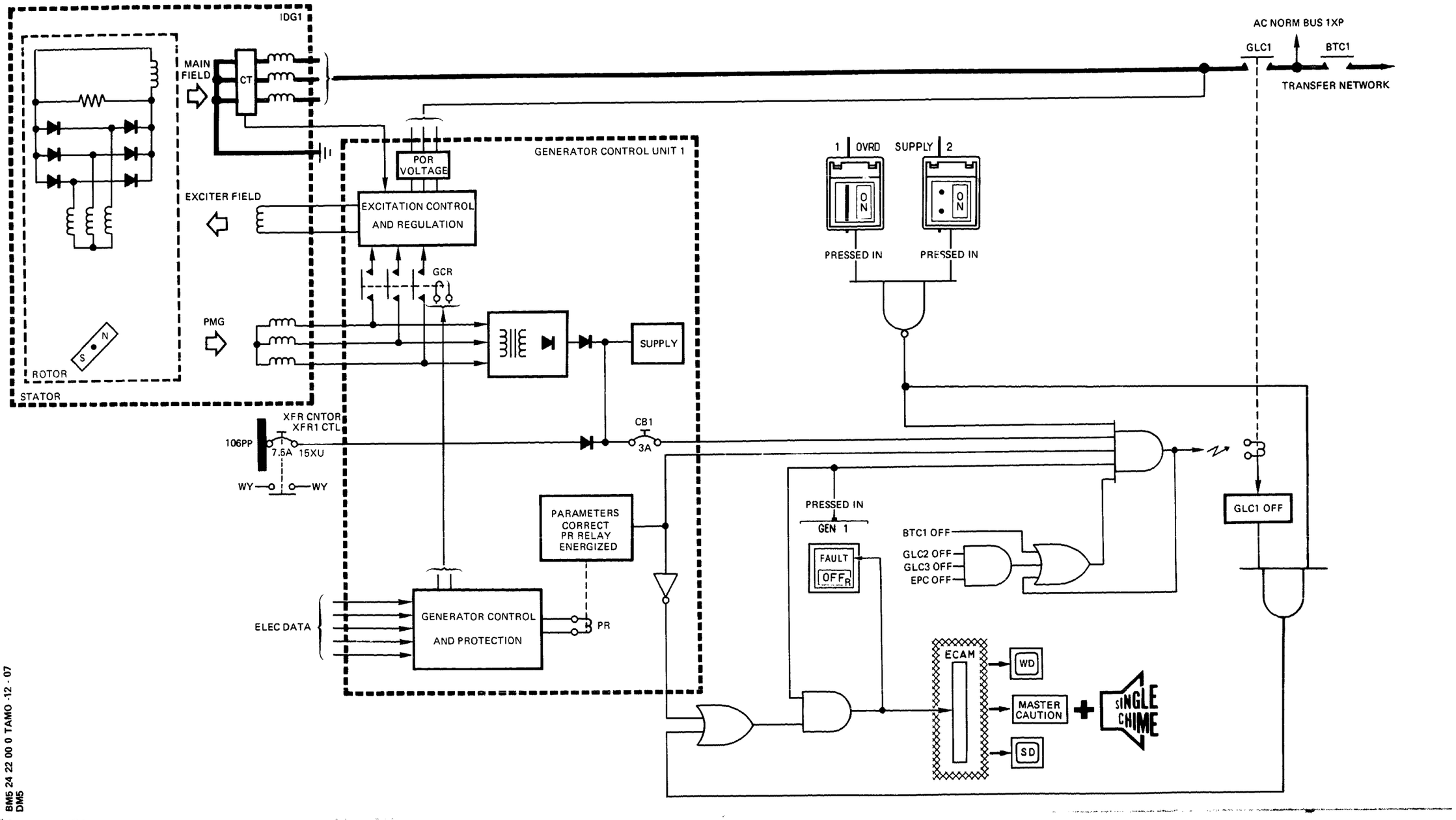
(Ref. Fig. 005)
(Ref. Fig. 006)

The operation of each generator is controlled by ELEC PWR/GEN 1 (2) pushbutton switch with two stable positions :
- OFF/R selected, the pushbutton switch is released out and the white legend is on : the generator is shut down (de-energized), and the line contactor is open
- ON selected the pushbutton switch is pressed in, the generator is energized, its rotational speed being high enough. If the electrical parameters are correct, the line contactor closes. The generator supplies its network.

The amber FAULT legend of GEN pushbutton switch located on ELEC PWR panel is repeated on the ECAM system and comes on to indicate a fault in the channel.
- fault detected and isolated by the GCU protection circuits
- or line contactor open

This legend goes off when OFF/R is selected.

NOTE : - GEN/FAULT legend also comes on when the generator control is set to ON and the engine shut down ;
- selection of OFF/R enables also the resetting of the GCU protection circuits after a fault detection (except if it is after the activation of the differential protection)
- when the generator is energized either manually by direct action on the pushbutton switch or automatically with the generator preselected to ON during an engine start, the corresponding BTC opens then the GLC closes the generator has a priority to supply its network (Ref. para 3).
- with ON selected, on both OVRD SUPPLY 1 and 2 pushbutton switches, the two generator line contactors open (smoke emergency procedure).
  Selection of this configuration does not modify the indication displayed (on or off) by GEN1 and GEN2/FAULT legends.



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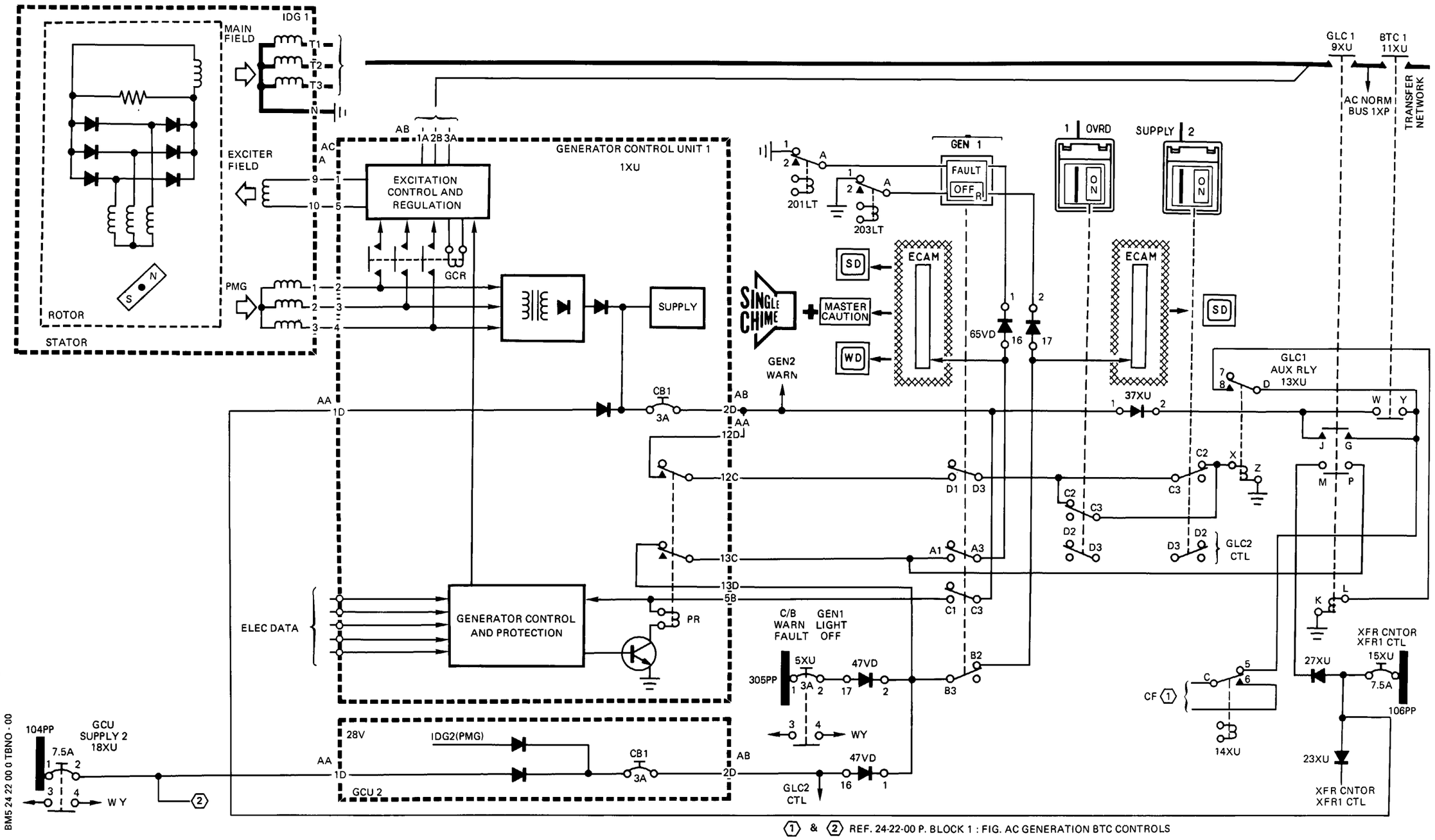
AC Generation - Controls and Indicating
Figure 005



AC Generation - Controls and Indicating
Figure 006

However, one or the other legend will come on if a fault is sensed and isolated by the corresponding GCU protection system.

(2)GCU general operating principle

(Ref. Fig. 007)

The unit has four functions :

- generator voltage regulation
- generator control and protection of network and generator
- control of the various warnings and indications
- self monitoring and test of the system. These various functions are achieved either by digital or analog circuitry.

The introduction of the digital system built up around the INTEL 8085 microprocessor, has permitted the integration of a test and failure diagnosis facility, thus considerably facilitating maintenance operations.

(a)Voltage regulation

The voltage is regulated by controlling the excitation of the generator so that the voltage is kept at the nominal point of regulation (POR). The POR is located in the electrical power center at the end of the generator feeder, upstream of the line contactor.

The excitation supply is derived directly from the PMG, that of the regulation circuits, and in fact of the GCU assembly, is too. Furthermore this supply is duplicated from the aircraft network (back up supply).

(Ref. Fig. 006)

(b)Generator control and protection functions

These functions mainly consist in generator excitation and line contactor control :

- the excitation is controlled via the GCR (Generator Control Relay)
- the line contactor is controlled via the PR (Power Ready Relay)

Both these relays are controlled by signals received or generated by the GCU :

- IDG disconnection
- engine shut-down by the fire handle
- over/under voltage
- over/under frequency
- differential protection
- rotating diodes short circuit
- PMG short circuit
- certain self-detected failures of the GCU (digital monitoring)

These control or fault signals cause generator de-energization and disconnection from the network. Except further to the differential protection activation, the system may be reset by selection of OFF/R generator control. More precisely, the PR is controlled by :

- the IDG drive underspeed which causes the generator shutdown
- and finally an incorrect phase order which prevents the generator from being connected to line.

NOTES : After a differential protection activation, the system resetting is performed by sequences
. at GCU level
. then by selecting OFF/R (Ref. para. C.(3) (a3))

(c)Control of the various indications (warnings and annunciators)

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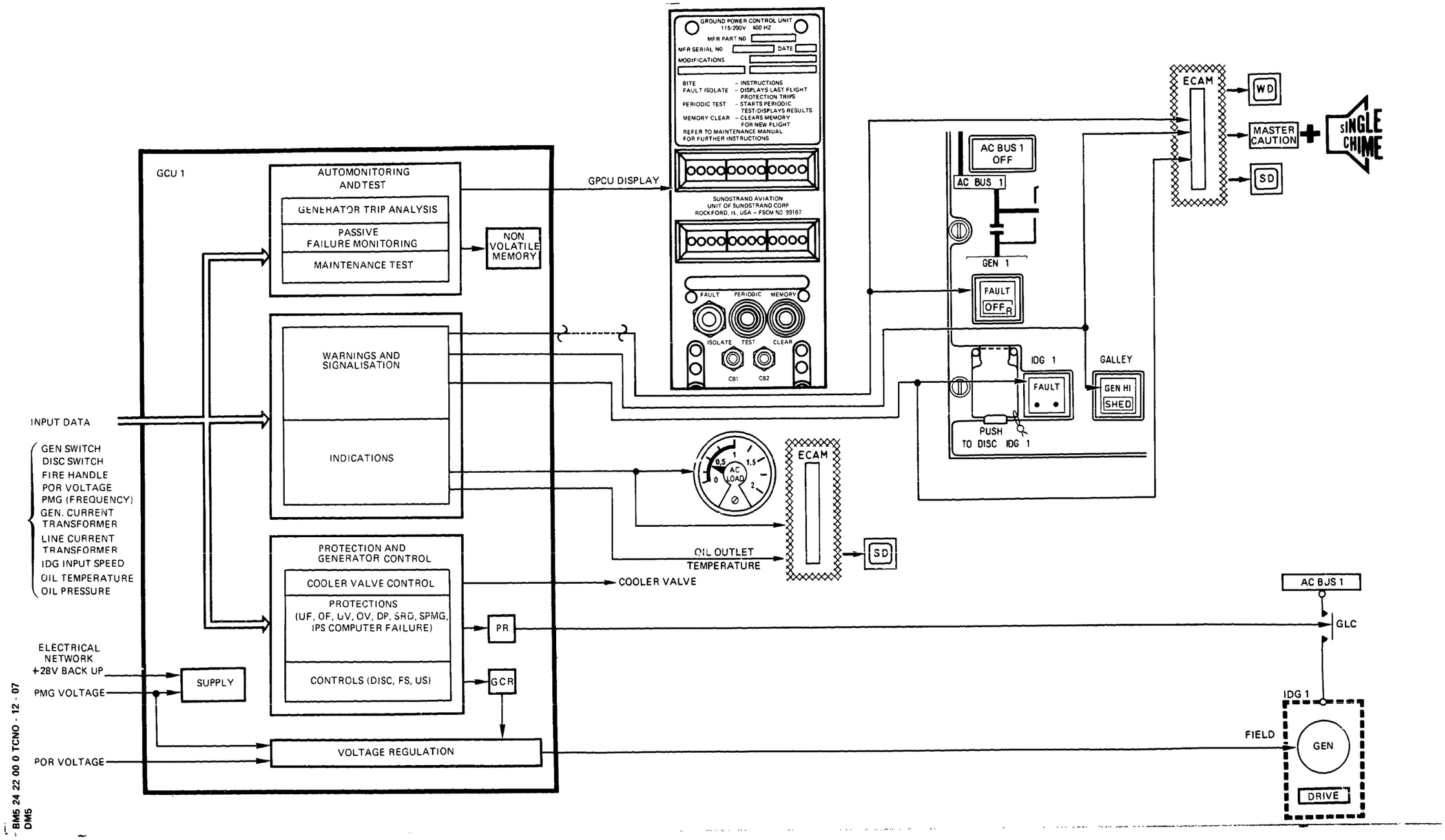


AC Generation - Generator Control Unit Block Diagram
Figure 007

1 The GCU controls the warnings and annunciators related to the IDG channel
- generator FAULT when the protections come into operation (PR opening)
- GEN HI when an overload is detected (Ref. 24-26-00, P. Block 1)
- IDG FAULT for the pressure and temperature of the cooling and lubrication oil system (Ref. 24-11-00, P. Block 1)

2 The GCU also generates the following data :
- generator load which is displayed on the monitoring panel and on the ECAM display unit (Ref. 24-27-00, P. Block 1)
- IDG oil-in and oil-out temperatures. The latter being displayed on the ECAM display unit (Ref. 24-11-00, P. Block 1)

(d)System self-monitoring and test function

This function can be divided into three different parts :
- test and analysis due to generator tripping
- passive fault detection
- maintenance test

1 Test and analysis due to generator tripping.

During a generator tripping (active failure), the GCU :
- identifies the protection which has caused the tripping (over-frequency, differential protection, etc...)
- analyses the conditions in which the tripping has occurred
- then, after analysis, determines the origin of the fault (GCU, wiring, or peripherals)

All these data are stored in a non volatile memory.
On the ground, they can be displayed on an alphanumerical display located on the front face of the GPCU by means of a serial data link between the two units (Ref. 24-41-00, P. Block 1)

2 Passive failure detection

Certain passive failures, that is those which do not cause generator tripping, can affect the system operation.
The GCU permanently monitors the majority of the circuits concerned.
When detecting a fault, the GCU determines the origin and stores the data in a non volatile memory.
As previously, these data can be displayed on the ground, on the GPCU display.

3 Maintenance test

It can only be performed on the ground, with the IDGs shut down.
It completes to a certain extent, the monitorings already described : the test is performed by exciting (stimuli) the circuits concerned and analysing the response.
It is controlled :
- either automatically and periodically, every seven (7) flights
- or manually,
  by means of the GPCU and the serial data link.

The result of the test is stored in a non volatile memory and can also be displayed on the ground, on the GPCU alphanumerical display.

B. IDG Generator (Ref. Fig. 008)

The IDG generator driven at constant speed, is a conventional, 3-coaxial component brushless generator :

- PMG
- rotating diode pilot exciter
- and finally, the generator itself.

It is cooled by oil spraying (Ref. 24-11-00, P. Block 1)

(1)PMG

It consists in :
- a twelve-pole permanent magnet inductor installed on the rotor,
- and a three phase armature, star connected and with no ground reference, which is installed on the stator.

As soon as the generator rotates, the electrical power which is necessary to :
- the generator energization
- the supply of the GCU and the various external relays and contactors (line contactors, etc...)

is supplied, and the system is thus electrically independent.
The PMG has been designed so as to withstand a possible short circuit at steady state operation.

(2)Pilot exciter

It consists in :
- a ten-pole inductor installed on the stator,
- a three-phase armature installed on the rotor and star connected,
- a rectifier assembly made up of six (rotating) diodes and of a filter

Its energization is directly controlled by the GCU and enables the supply of the generator inductor with direct current via the armature and rectifier.

(3)Generator

It comprises :
- a four-pole inductor, installed on the rotor and supplied by the exciter,
- the power armature installed on the stator, three-phase star connected, with a neutral side connected to the aircraft structure.

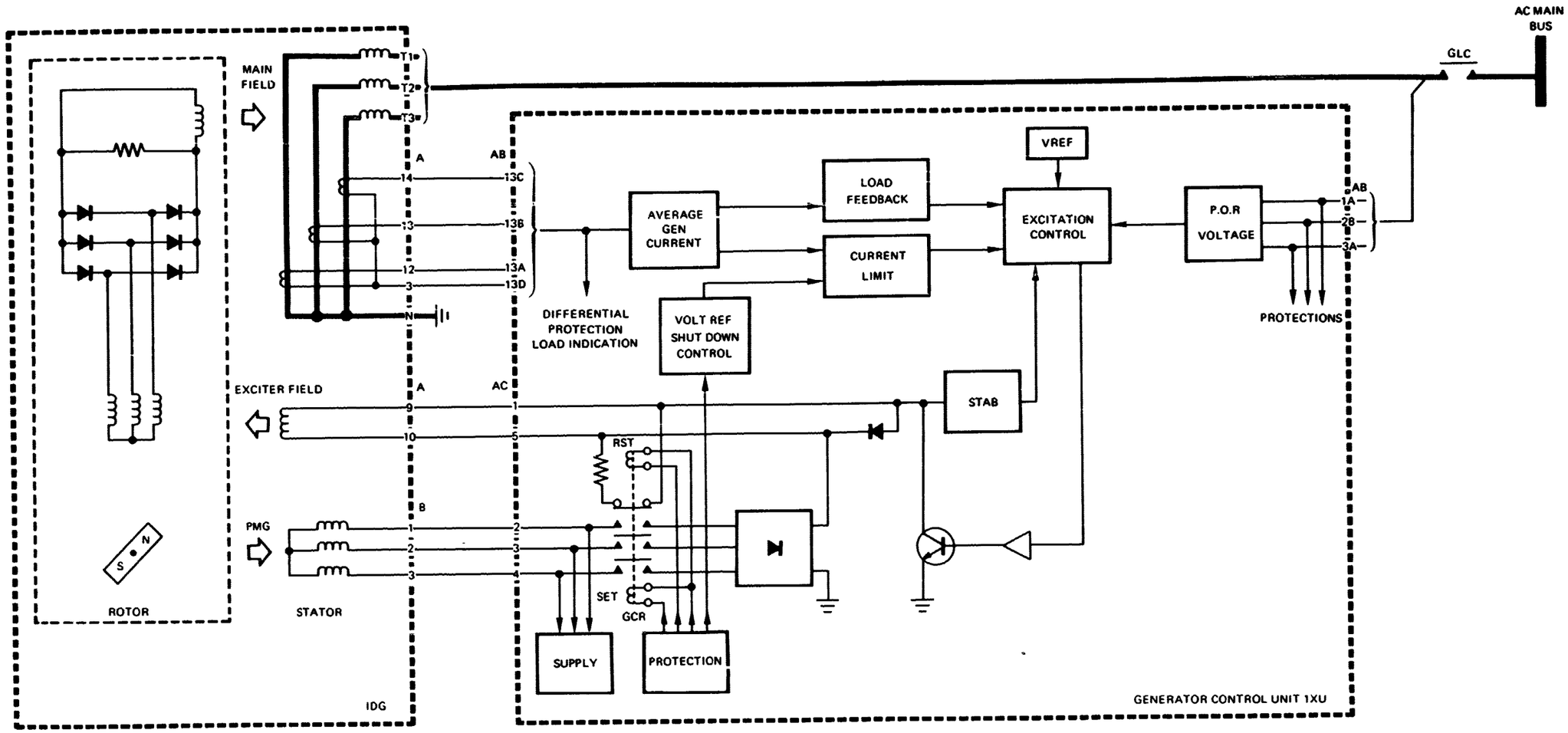
It should be noted that the three coils are connected through current transformers to the generator neutral side. The current data for the three phases are provided to the GCU.

(4)General characteristics

- PMG
  - nominal load : TBD
  - no load voltage : 88V between phases
  - short circuit current : 13A.
  - frequency : 1200 Hz at 12,000 rpm
- generator
  - nominal load : 90KVA
  - overload : 112.5KVA 5mn
    150KVA 5sec.
  - voltage : 115V three phases with neutral ground connected
    (at POR) (regulated by the GCU)
  - frequency : 400Hz at 12,000 rpm
  - current transformers, rate = 1/1000

C. Generator Control Unit (GCU)

The GCU has four different functions :



BMS 24 22 00 0 ADMO

AC Generation - IDG Generator and Voltage Regulation
Figure 008

- voltage regulation
- generator control and protection of the network and generator,
- control of the various indications,
- system test and self-monitoring

These functions, and generally speaking the voltage regulation is performed in the analog form, whereas the other functions are digital.

(1)GCU supply

The GCU is supplied (Ref. Fig. 006)

- directly from the PMG (which is also used for generator excitation supply)

The GCU generates 28VDC from this voltage and for its own needs (±15V, ±5V, -28V supply).

- and with 28VDC from the aircraft normal network.

This dual supply constitutes the internal 28V internal supply (back-up supply).

(2)Voltage regulation (Ref. Fig. 008)

The voltage regulation is performed by regulating the generator excitation current.

The regulation is achieved by analog circuits. The excitation supply is directly provided by the PMG via the GCR and after rectification is controlled by a chopper amplifier (pulse width modulation) protected by a freewheeling diode. The regulation is achieved using the following data :

- voltage sensed at the point of regulation (POR),
- generator load provided by the three current transformers included in the IDG, by comparison to a reference and so that the average voltage of the three phases can be maintained within the permissible limits.

It should be noted that :

- during an operation in unbalanced rating, the voltage level of the higher phase is limited. This limit has a priority on the regulation of the three phase mean voltage.
- a stabilization circuit enables the dynamic response of the regulation to be improved.
- a current limiter circuit enables limitation of the generator supplied current and thus of the mechanical power supplied by the drive part, by limitating the excitation current.

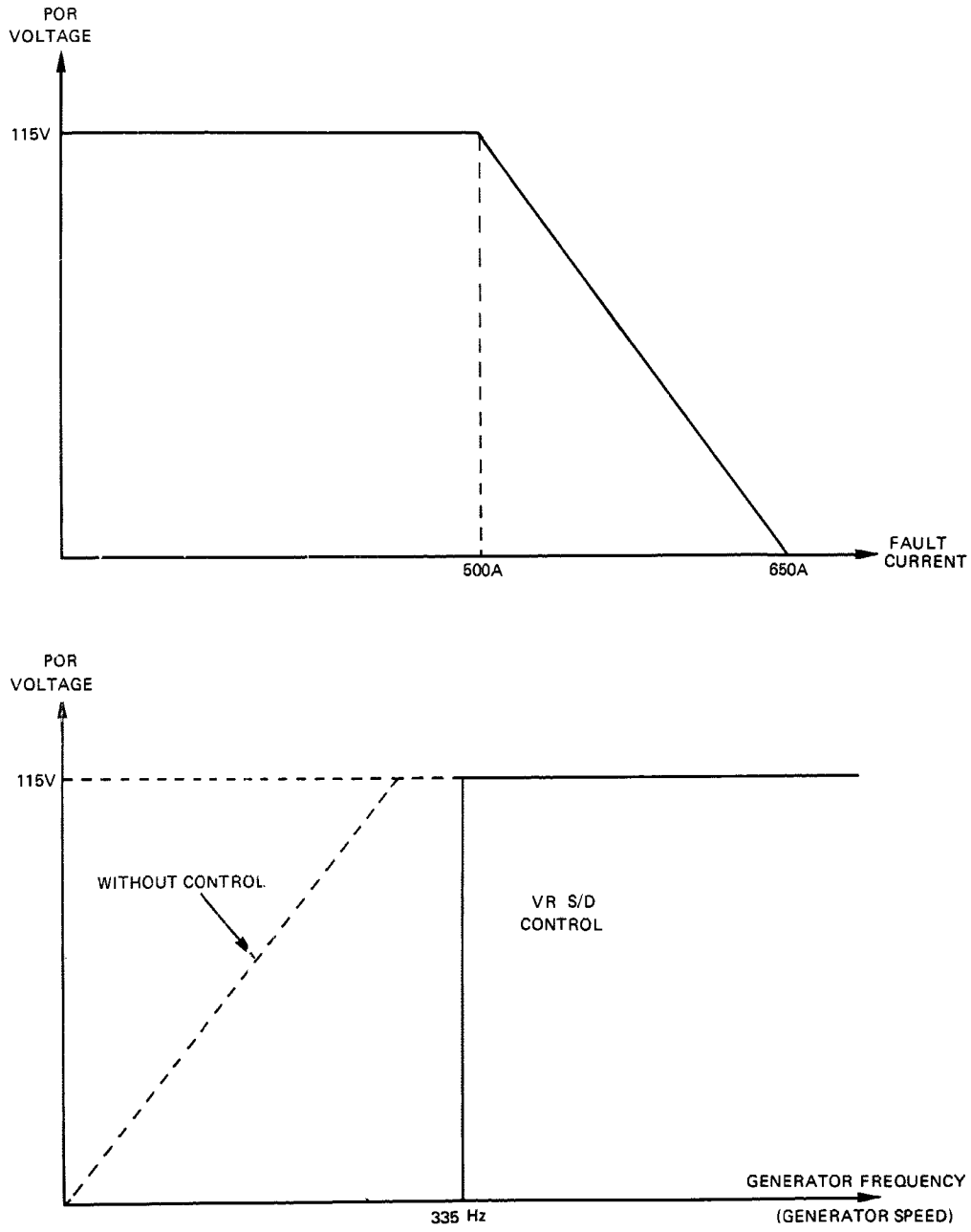
The voltage/current relationship is as shown in Detail A (Ref. Fig. 009)

- in case of fault detection by the protection circuits the generator excitation is cut off :
  - . electronically, by simulating a noticeable short circuit via the current limitation (voltage regulation shut down : VR S/D), Ref. para (3) (b3)
  - . and by cutting off its supply by the GCR
- with generator selected on line by GEN pushbutton switch, the excitation command signal (VR S/D) is also used to command :
  - . the initial generator excitation at engine start ; the voltage/frequency relationship is as shown in Detail B (Ref. Fig. 009)
  - . its de-energization at engine shutdown

In this particular use (ON function selected), the GCR remains closed.

(3)Generator controls and protection functions

(Ref. Fig. 010, 011)



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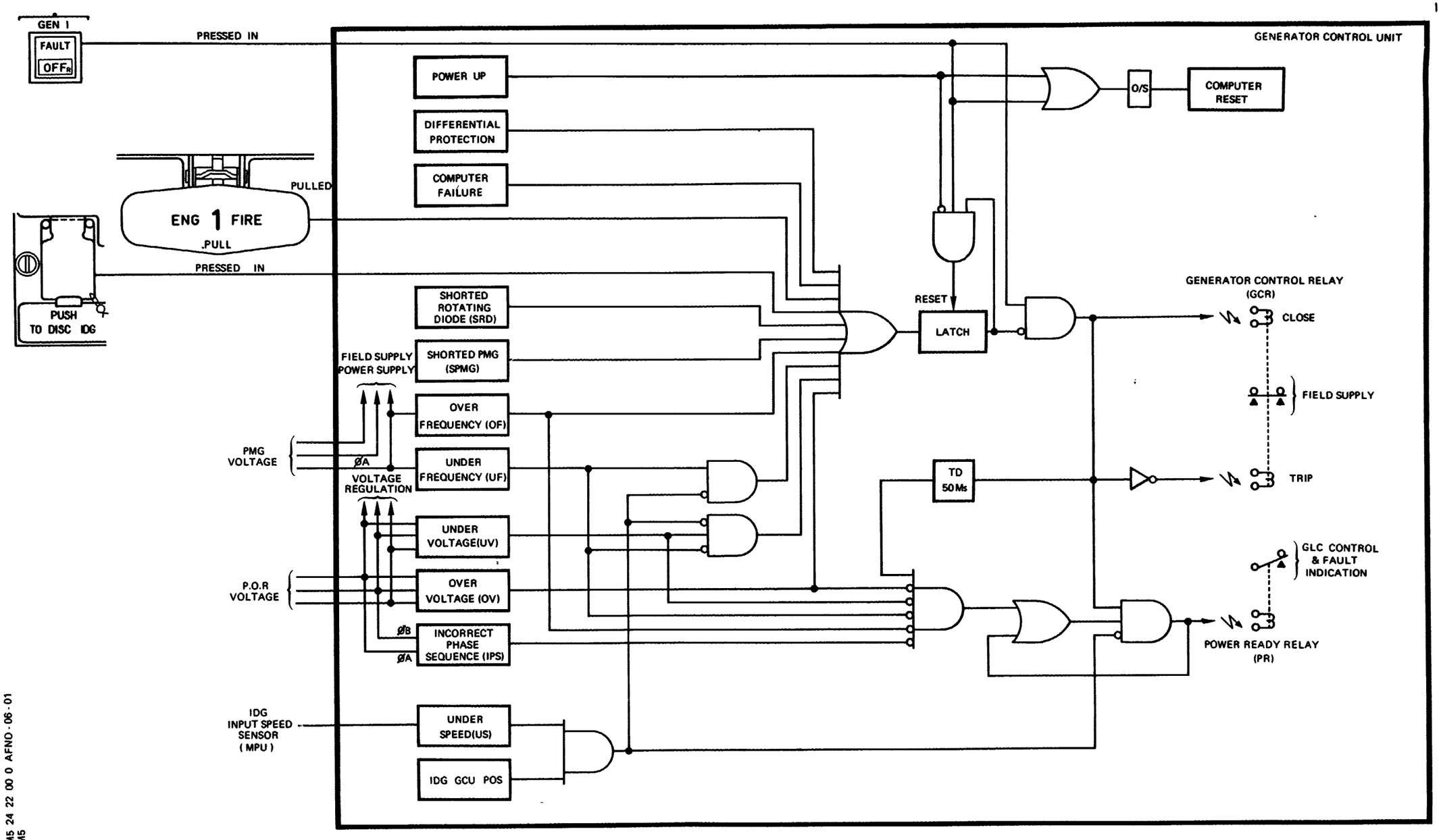
AC Generation Voltage/Frequency Control During
Engine Start up
Figure 009



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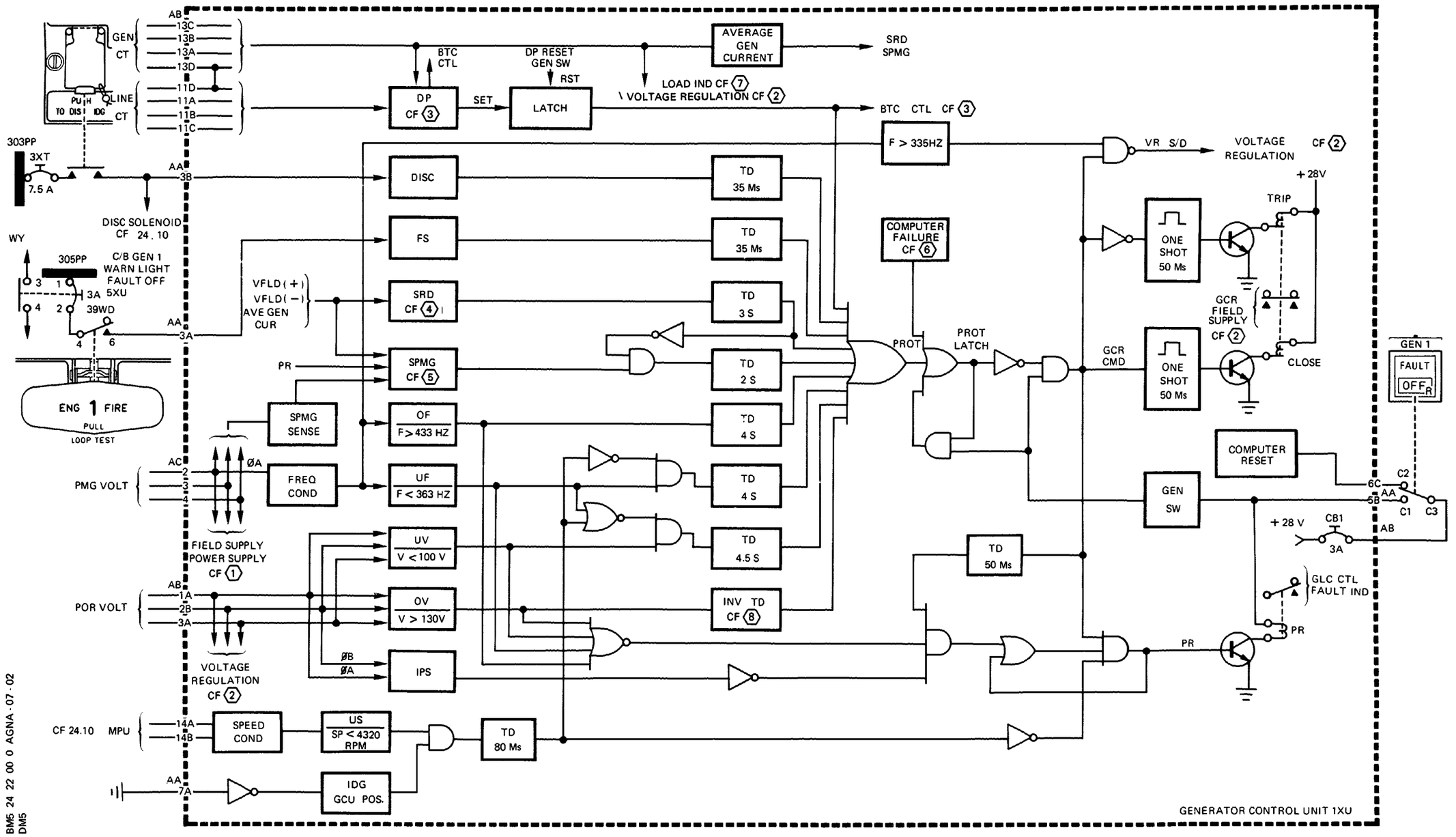
AC Generation - Generator Control Unit GCR and PR Controls
Figure 010



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AC Generation - Generator Control Unit GCR and PR Controls -Sheet 1/2
Figure 011

(1) REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – CONTROLS AND INDICATIONS

(2) REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – IDG GENERATOR AND VOLTAGE REGULATION

(3) REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – DIFFERENTIAL PROTECTION

(4) REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – SHORTED ROTATING DIODE PROTECTION

(5) REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – SHORTED PMG PROTECTION

(6) REF 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – COMPUTER MONITORING

(7) REF. 24-22-00 P. BLOCK 1 . FIG. AC GENERATION – GENERATOR LOAD INDICATION AND OVERLOAD WARNING CONTROL

(8) REF. 24-22-00 P. BLOCK 1 : FIG. INVERSE TIME DELAY CHARACTERISTIC FOR OVERVOLTAGE PROTECTION

BM5 24 22 00 0 AGNM 07 02
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AC Generation - Generator Control Unit GCR and PR Controls -Sheet 2/2
Figure 011

The generator control and the network as well as the generator protection functions are mainly provided by means of the GCR and PR.
The GCR controls the excitation of the generator, the PR, its line contactor and FAULT warning light.
These two relays are themselves controlled by a microcomputer which processes the various electrical parameters necessary to the protection functions.
NOTE : The microcomputer processes also the indication controls and controls the system test and self-monitoring.

(a)Protections

1 over/underfrequency (OF/UF)
The control unit monitors permanently the frequency of the PMG phase A.
The over/underfrequencies are triggered when they become higher/lower than a certain threshold.
NOTE : . The underfrequency is inhibited in case of drive underspeed (Ref. para (b2))
. The over/underfrequencies are also operational with the generator not excited (PMG frequency measurement)

2 Over/undervoltage (OV/UV)
The control unit monitors permanently the voltage of the three phases at the POR.
The undervoltage is triggered when the voltage of the lower phase becomes lower than a certain threshold.
In the same way the overvoltage is triggered when the voltage of the higher phase becomes higher than a certain threshold.
NOTE : The undervoltage is inhibited in case of :
. drive underspeed
. underfrequency

3 Differential protection (DP)
* It prevents the electrical wiring between the two detection current transformers from being damaged (Ref. Fig. 012, 013)
The protected area may be divided into two parts :
- area 1, between the generator current transformer and the line contactor, and comprising the generator coils and feeder,
- area 2, between the line contactor and the line current transformer and comprising the whole power distribution wiring and part of transfer network (Ref. 24-50-00, P. Block 1)

* When the generator supplies its network, and if necessary the other network by means of the transfer circuit, the two generator and line current transformers sense the same current.
In case of fault in the wiring (leakage to the ground or short circuit between phases) it is no longer the case : the noticeable difference between the two current information triggers the protection which operates sequentially :
- it controls first the opening of the two line and transfer contactors ; the generator is still excited.
- if the fault persists (fault in area 1), the generator is de-energized and the transfer contactor closes automatically, thus enabling the network to be supplied by another source of generation.

- if the fault desappears (fault in area 2), the generator is de-energized and the transfer contactor is maintained open, so as to isolate the fault : the corresponding main busbar is lost.

* When the generator is cut off, and particularly when the distribution is provided from another power source (generator of the other IDG, APU generator or ground power unit), the protection of area 1 is no longer useful, whereas that of area 2 remains operational :
- the generator current transformer senses a null current
- as well as the line current transformer, since both the power input by means of the transfer circuit, and the distribution towards the aircraft network pass through (sum of currents, null)

In case of fault in area 2, the current transformer delivers a current information which is not null and causes the protection triggering as described previously.

NOTE : The differential protection monitors individually the three power phases and takes into account the current imbalance on the phase where it is the most important.

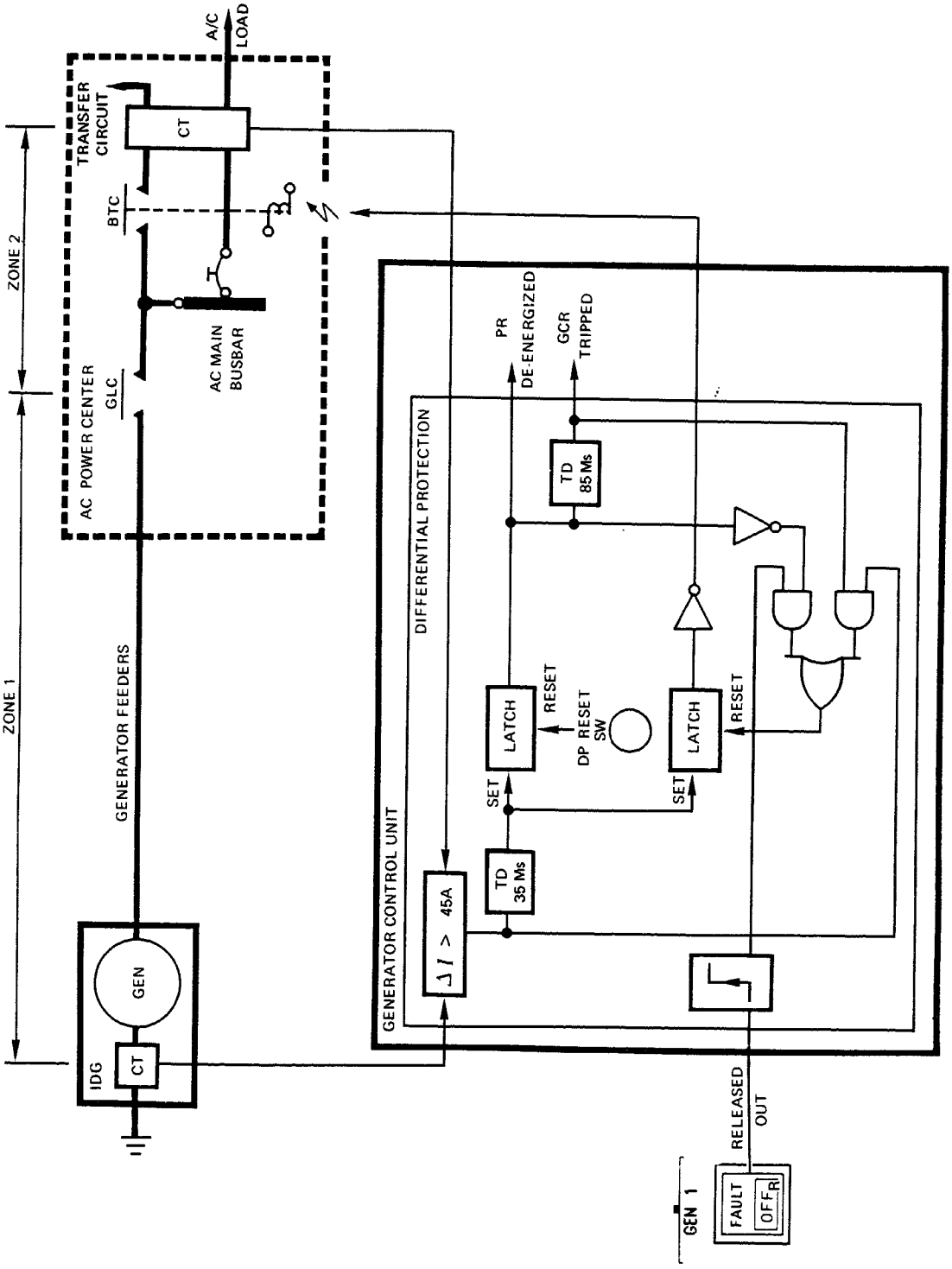
* The protection triggering (area 1 or 2) is memorized by the control unit even if its supply is cut off.
The system can be reset :
- by cycling the ELEC PWR/GEN pushbutton. 2 times are only allowed.
Or in sequence :
- by pressing DP RESET pushbutton on the face of the control unit located in the avionics compartment (control unit supplied) (Ref. Fig. 014)
- then by selecting OFF/R on ELEC PWR/GEN pushbutton switch on the flight compartment overhead panel.

4 Shorted rotating diode (SRD) (Ref. Fig. 015)
This detection is performed using the following data :
- the voltage at inductor terminals
- generator load

The protection is triggered if, for a given generator load, the voltage at inductor terminals becomes too high.

5 Shorted PMG (SPMG) (Ref. Fig. 016)
This detection is performed using the following data :
- inductor voltage (hot point),
- generator load,
- PR relay control,
- short circuit provided by an analog detector monitoring the voltage of the three phases of the PMG.

With the generator running without load (PR relay open), a possible short circuit is detected by the analog circuit.
Generator in line, the protection is triggered if, for a given load, the inductor load is too low.
It should be noted that in both cases this protection is inhibited in case of shorted diode detection.



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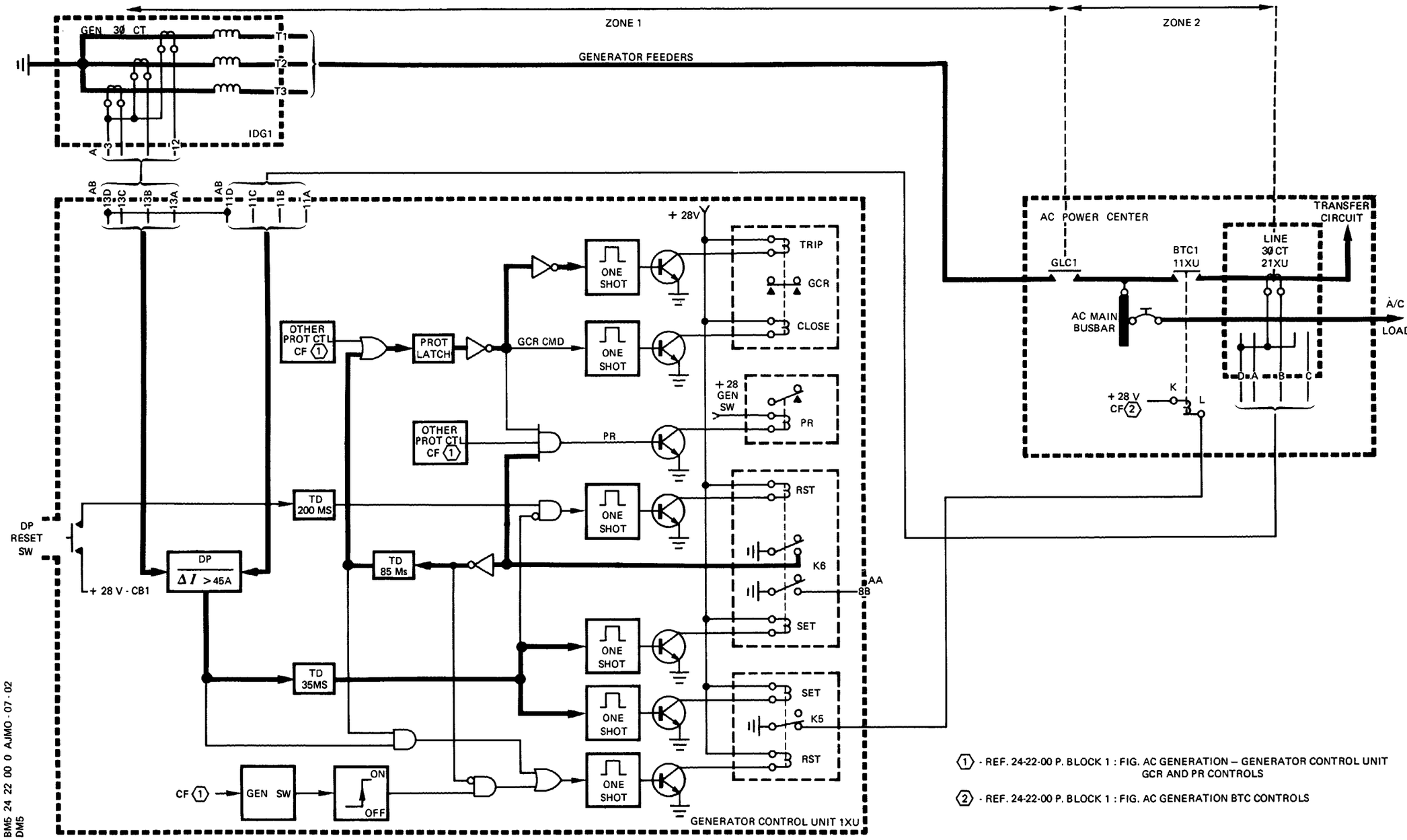
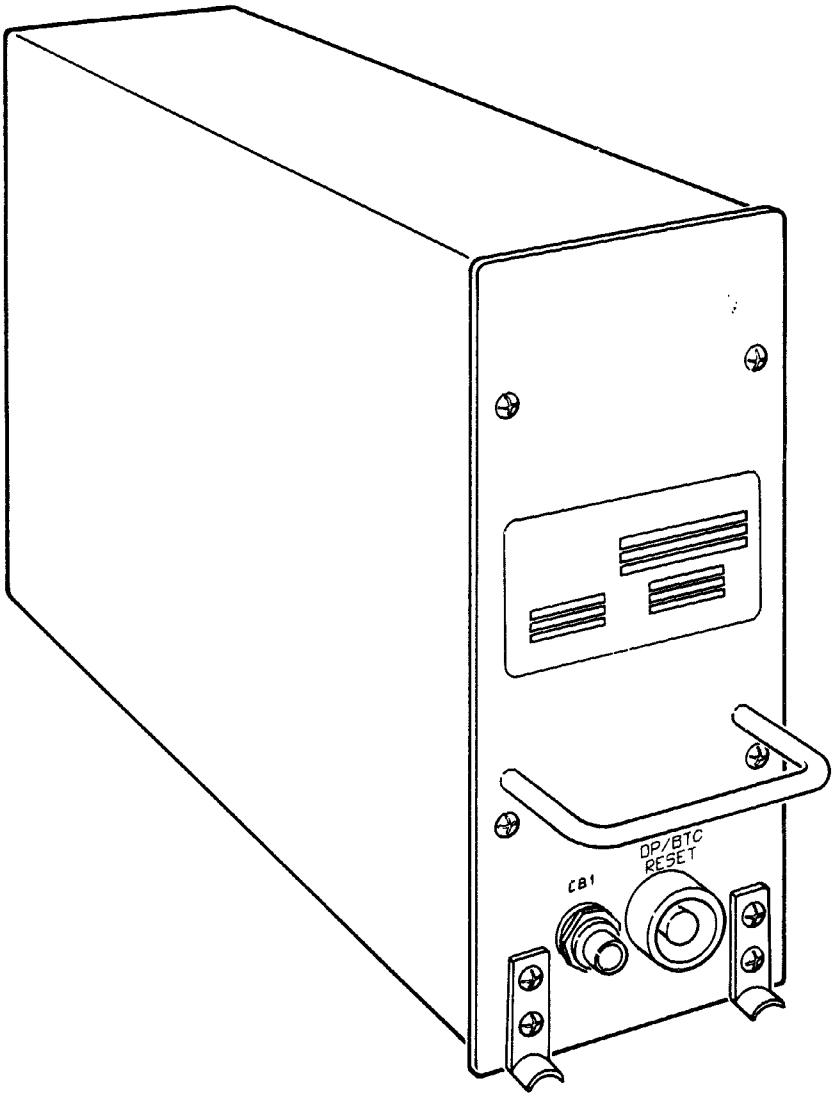
AC Generation - Differential Protection
Figure 012



1 - REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION – GENERATOR CONTROL UNIT GCR AND PR CONTROLS

2 - REF. 24-22-00 P. BLOCK 1 : FIG. AC GENERATION BTC CONTROLS

AC Generation - Differential Protection
Figure 013



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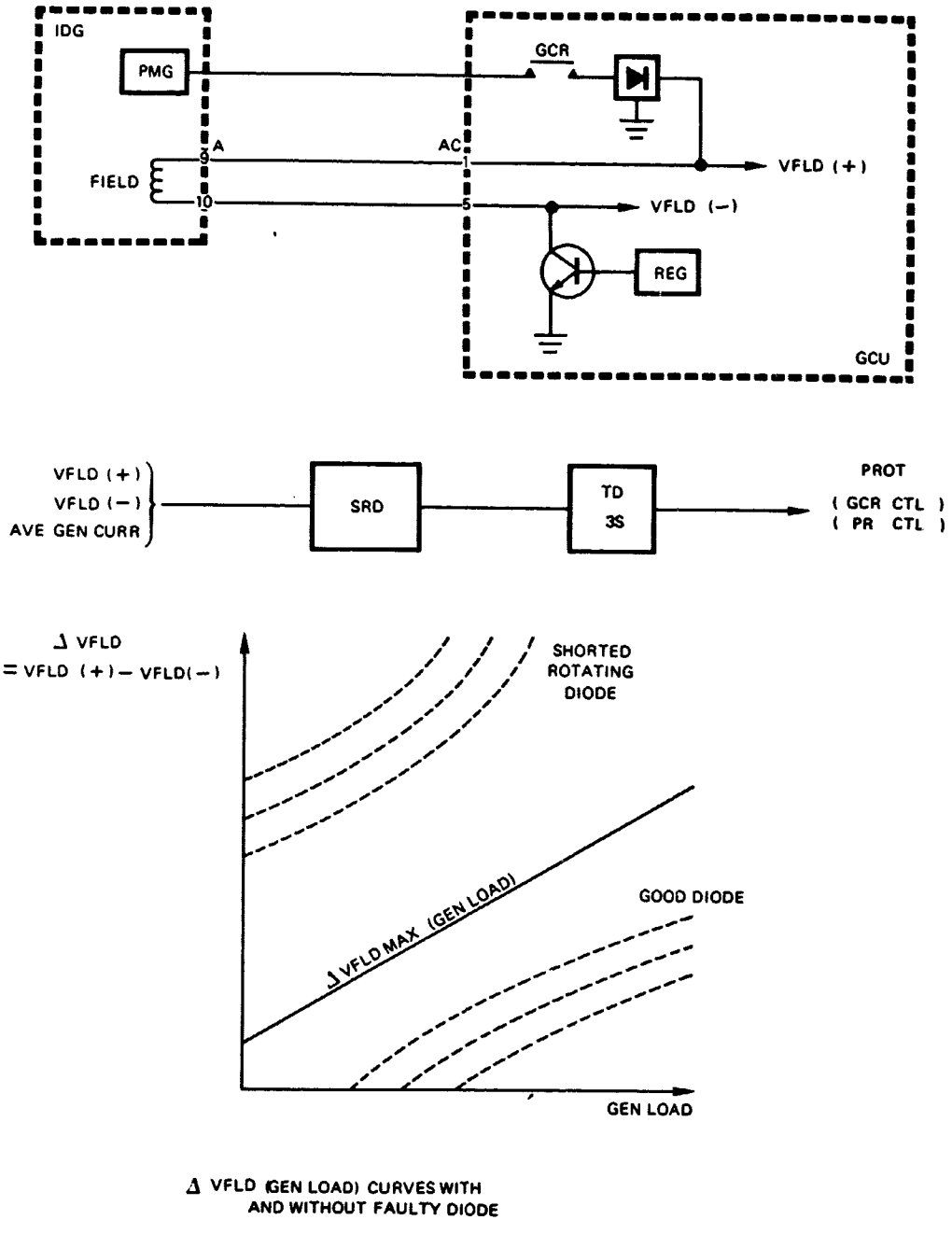
AC Generation - Generator Control Unit
Figure 014



Δ VFLD (GEN LOAD) CURVES WITH AND WITHOUT FAULTY DIODE

BM5 24 22 00 0 ALMO

AC Generation - Shorted Rotating Diode Protection
Figure 015

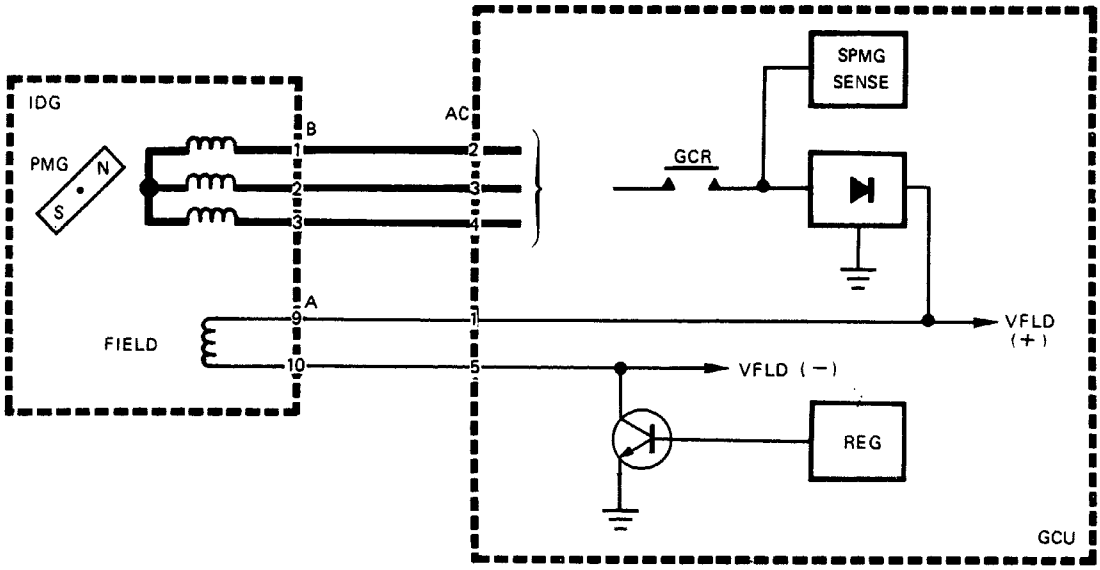
6 Incorrect phase order (IPS)
This detection is provided by voltage information from phases A and B at the point of regulation.
Once the generator is excited the control unit analyzes the phase order of the voltage it supplies. If the phase order is incorrect, the data is sent to the generator, where it is connected to line. (protection of the three-phase consumers)

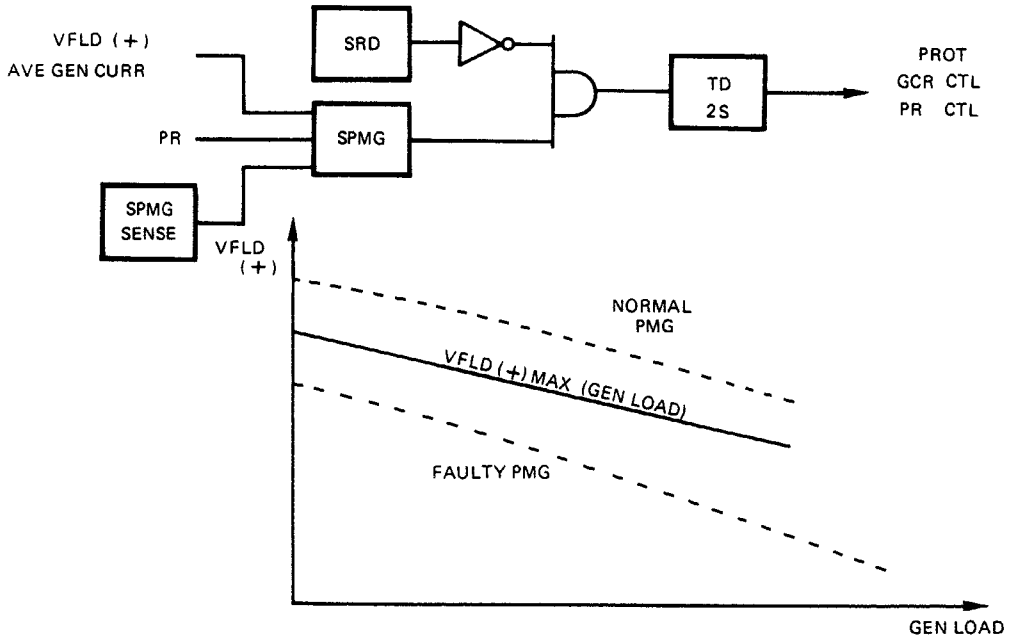
7 Control Unit Fault (Ref. Fig. 017)
The control unit processes all its assigned functions in a sequential and periodical mode and according to a predetermined program.
Once the system initialized, all the operations are performed during a so-called "major" cycle which comprises essentially :
- the control, protection and indicating functions,
- the system test and self-monitoring functions.

The correct development of the program is monitored by two distinct means :
- a monitoring enabling the detection of a discrepancy in the periodical development of the program (watch dog one shot) and which in case of fault causes the generator tripping, together with its de-energization
- a monitoring enabling the detection of soft failures and which is in case of fault, causes a total re-initialization of the system.

Nevertheless, the detection of six faults of the type within one second is considered as hard failure and also causes the generator tripping and de-energization

NOTES : - The protection function and the generator control (GCR, PR) function are both processed by the control unit.
The monitoring of the program periodical development enables a fail-safe triggering of the system to be provided in case of fault detection, by a direct analog command at the two relays.
- Further to a protection triggering, the system can be reset by selecting ELEC PWR/GEN pushbutton switch on the flight compartment panel from OFF/R to ON.
- A test of the majority of the control unit fault detection circuits is automatically performed :
. aircraft on the ground,
. during an engine shutdown (IDG drive underspeed, Ref. (b2)) and lasts 20 sec. when the test develops normally.





– – – – – –VFLD (+) (GEN LOAD) CURVES WITH NORMAL PMG AND WITH FAULTY PMG

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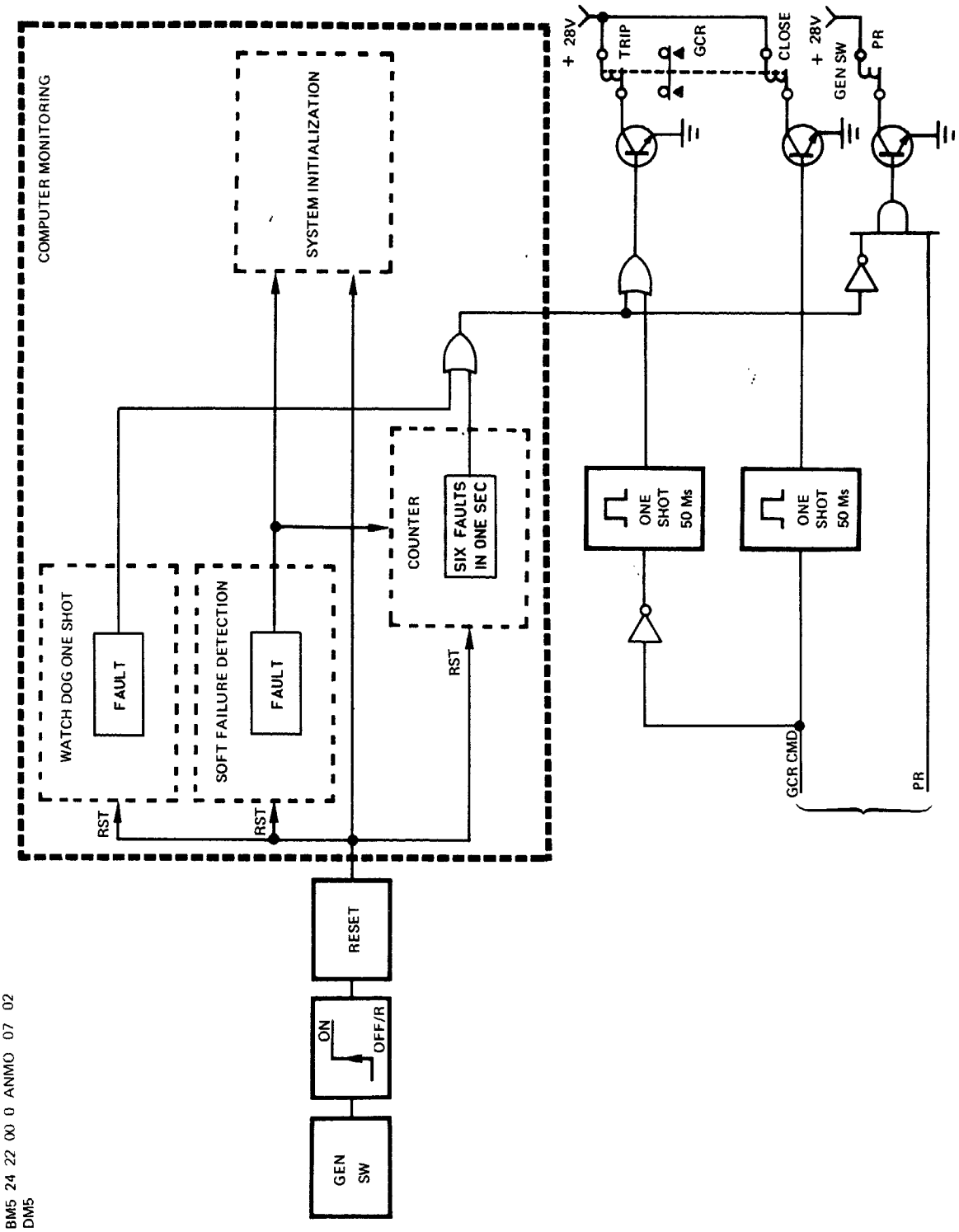
AC Generation - Shorted PMG Protection
Figure 016



AC Generation - Computer Monitoring
Figure 017

(b)Various controls

1 IDG disconnect order and engine shutdown command by the fire handle/ (DISC, FS). The control unit receives the following data :
- the IDG disconnect command
- engine shutdown from the fire handle

The activation of one of the two commands causes the immediate generator shutdown and de-energization.

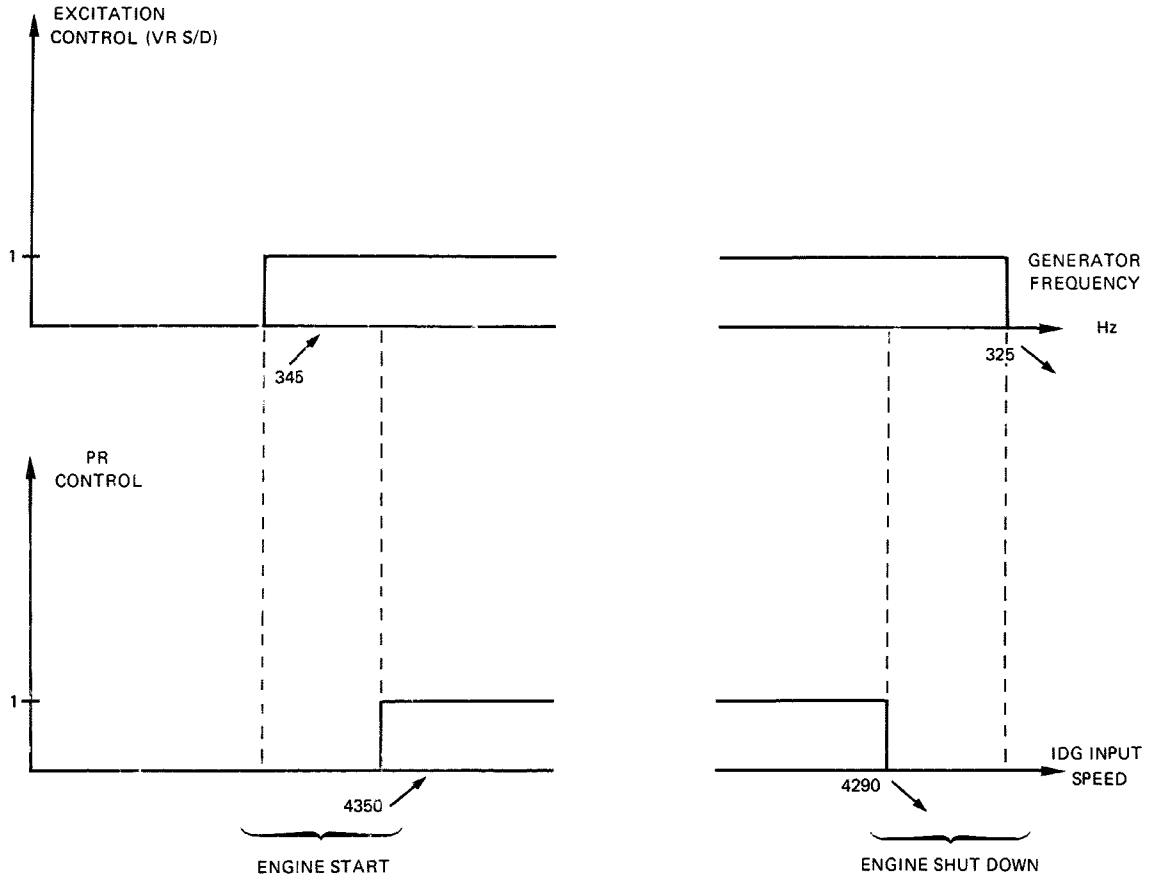
2 Drive underspeed detection
The IDG drive speed data is generated from a signal detected by the input speed sensor (MPU) located on the IDG drive shaft upstream of the disconnect mechanism (Ref. 24-11-00, P. Block 1)
A drive underspeed detection results in generator shut down order (PR).

NOTE : In the case of engine shutdown, the underfrequency occurring after a drive underspeed, causes the generator de-energization (VR S/D, Ref. para (b3) and (Ref. Fig. 018)

3 Control of the generator excitation at regulation.
In case of fault detection by the protection circuits, the generator excitation is cut off :
- when cutting off supply to the inductor by the GCR
- electronically, at regulation level (Ref. para (2)) by simulating a noticeable short circuit via the current limitation (VR S/D).

With generator operation selected, the excitation order signal (VR S/O) is used to command :
- the generator energization at engine start up
- its de-energization at engine shutdown according to the generator rotational speed (Ref. Fig. 018)

4 Control of the air/oil cooler air control valve on the IDG oil cooling system
For reference only (Ref. 24-11-00, P. Block 1), the control unit controls the opening of the valve in the case of IDG oil in temperature being too high.



WITH GENERATOR CONTROL SWITCH TO ON AND GCR CLOSED

BM5 24 22 00 0 APMO

AC Generation - Generator Control During
Engine Start and Shut Down
Figure 018

(c)Control and protection operation in normal use

1 Initial energization of the generator

- with generator operation pre-selected (**GCR** closed) at engine start, the generator is excited as soon as its rotational speed is high enough (**VR S/D**)

If the voltage frequency and phase order are correct, the **PR** commands the generator energization as soon as the **IDG** drive speed (**USTD**) is high enough

- with engine at idle (generator and **IDG** rotational speeds high enough), the selection of the generator to **ON** enables :
  . its energization (closure of the **GCR**)
  . then, if voltages, frequency and phase order are correct, it is energized (closure of the **PR**) 50ms later.

2 Generator supplying the network

In case of one protection being triggered :

UF/OF
UV/OV
DP
SRD
SPMG
Control unit fault,

and after the associated timing, the control unit controls :

. the generator tripping (**PR** opening)
. and its de-energization (opening of the **GCR, VR S/D**)

The system can be reset by selecting **ELEC PWR/GEN** pushbutton switch from **OFF/R** to **ON** (except for the differential protection, ref. para. (d3))

(4)Generation of warnings and indications

(a)Warnings

1 Generator fault warning : indicated by **ELEC PWR/GEN** pushbutton switch **FAULT** legend (Ref. Fig.)

This warning comes on and is repeated on the **ECAM** system when the **PR** opens further to the activation of one of the protections or if the line contactor is open.

FAULT warning goes off by selecting **OFF/R**.

2 **GEN HI** Warning (Ref. Fig. 019)

For reference only (Ref. 24-26-00, P. Block 1), the control unit controls the illumination of **GEN HI** legend, with triggering of the master warning system, in case of high load detection.

The warning light goes off when the load has dropped below the detection threshold.

3 **IDG** fault warning

For reference only (Ref. 24-11-00, P. Block 1), the control unit controls the illumination of **ELEC PWR/IDG** annunciator **FAULT** legend, with triggering of the master warning system, in case of **IDG** oil low pressure or overheat.

The warning light goes off as soon as the **IDG** drive speed becomes lower than 2000 rpm.

NOTE : The low pressure warning is inhibited at engine shutdown

(b)Indications

The control unit processes also the following indications (analog circuits) :

- generator load (Ref. Fig. 019) and (Ref. 24-27-00, P. Block 1)
- **IDG** oil temperature (Ref. 24-11-00, P. Block 1) displayed on the **ECAM** display unit

NOTE : The control unit provides the **IDG** oil-out temperature information.

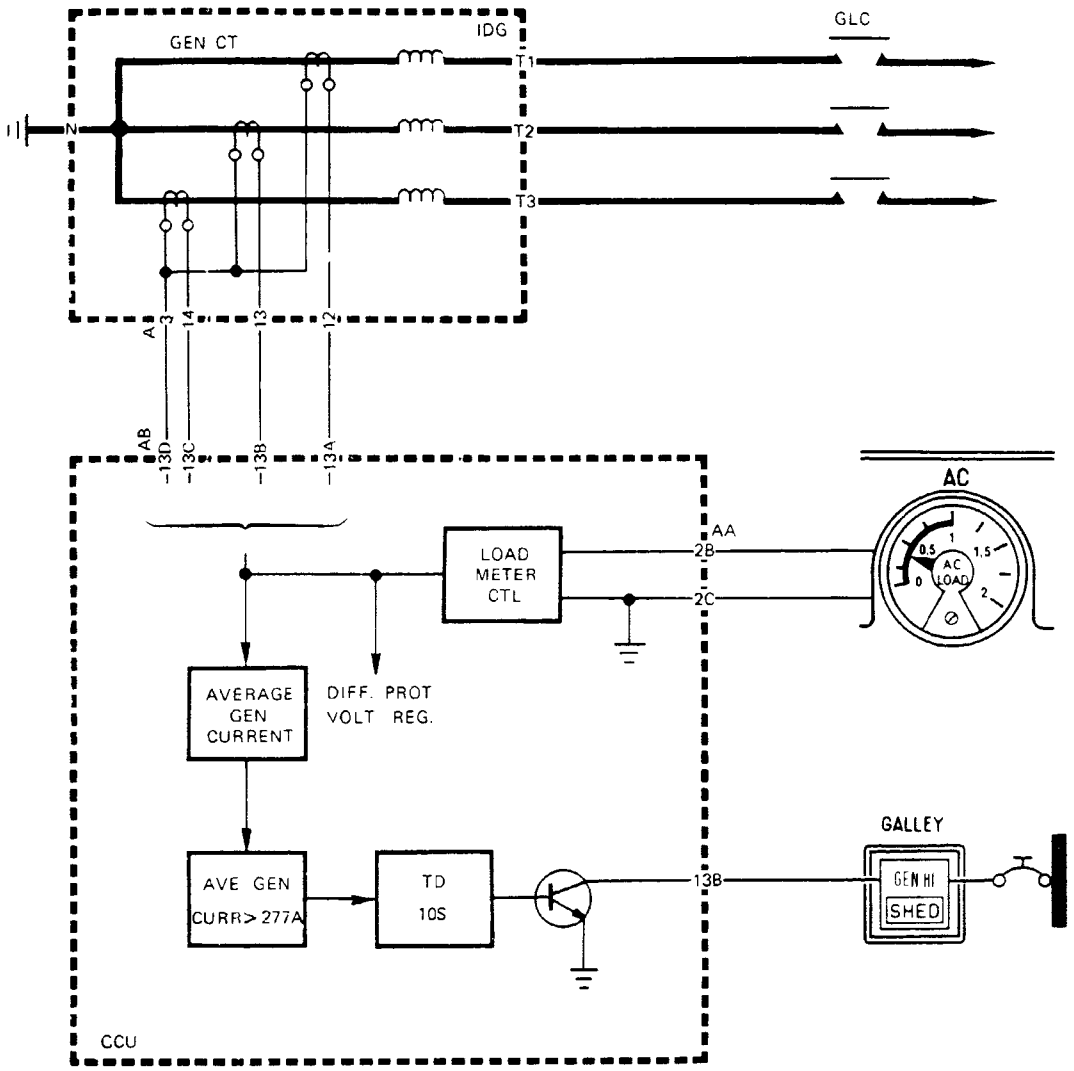
The **IDG** oil-out temperature data is displayed on the **ECAM** display unit.

(5)System self-monitoring and test functions (**BITE** function)

The purpose of the **BITE** (Built-in Test Equipment) is :

- to identify any protection causing generator de-activation (active failure) and determine the origin of the failure (**GCU**, generator, wiring or peripherals)
- to detect and isolate any passive failure
- to store a record of the failures (active failures or passive failures) and of their causes in the Non Volative Memory (**NVM**) of the **GCU**.
- to determine if the aircraft begins a new "flight", and if it is the case, to record the fact in the **NVM** of the **GCU**.
- to communicate the failure messages to the **GPCU** when needed by the maintenance personnel (by pressing **FAULT ISOLATE** pushbutton switch on the **GPCU**)
- to perform when needed by the maintenance personnel (by pressing **PERIODIC TEST** pushbutton switch on the **GPCU**), a **GCU** circuitry checking test and communicate the results to the **GPCU**
- to carry out an automatic and periodic test every seven flights when the aircraft is on the ground.

NOTE : **FAULT ISOLATE** and **PERIODIC TEST** functions are only available with aircraft on the ground.



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AC Generation - Generator Load Indication
Figure 019

(a)Identification and isolation of any protection causing generator de-activation

In case of generator de-activation, the **GCU BITE** :

- determines as a first step, which protection has been operative (by testing the program parameters associated with the various protections)
- then, by testing the **GCU** circuit corresponding to the activated protection, localizes the failure which has initiated the protection sequence : failure internal to the **GCU**, to the generator or occurring at system wiring level.

Two failure messages are generally generated in case of generator de-activation :

- one message indicates the type of protection which has caused the de-activation
- another message localizes the failure having triggered the protection.

These messages are coded and the codes are recorded (as they are generated) in the **GCU NVM**.

They can be displayed on an alphanumeric display window, located on the face of the **GPCU**, (by pressing **FAULT ISOLATE** pushbutton switch) if by for the maintenance personnel.

Messages can only be displayed with aircraft on the ground.

(b)Detection and isolation of the passive failures

Some passive failures which do not de-activate the generator can affect the system operation. The **GCU BITE** monitors permanently most of the circuits concerned. The monitored circuits deal with :

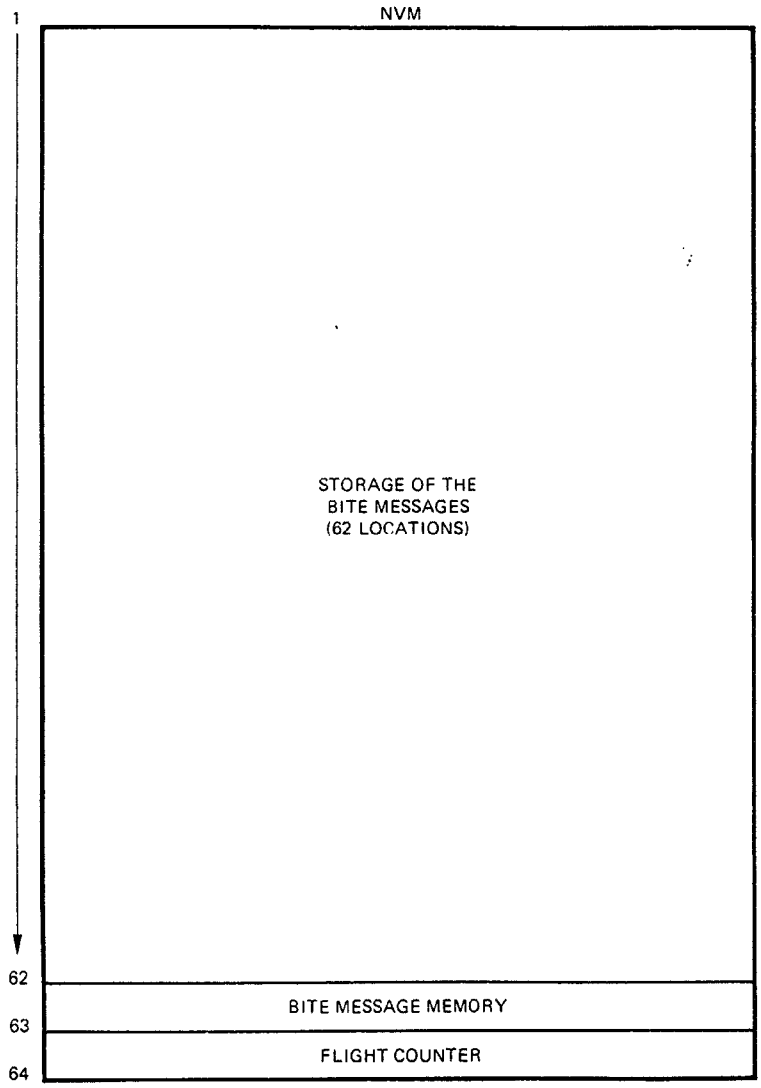
- voltage regulation
- **PR** and **GCR** relays
- generator line contactor
- current sensing
- **GCU** circuit breaker and associated circuitry
- **GCU** supplies
- generator underspeed
- phase sequence order
- generator oil inlet and outlet temperature bulbs

  NOTE : **APU** generator has only one temperature bulb installed.
- **IDG** low oil pressure switch (only if the **GCU** is associated with an **IDG**)
- secondary cooler valve and associated circuitry (only if the **GCU** is associated with an **IDG**)
- current transformers
- serial data link (from **GCU** to **GPCU**).

As soon a passive failure is detected by the **GCU BITE**, the code of the **BITE** message corresponding to that failure is generated and recorded in the **GCU NVM**.

This message can be displayed on the **GPCU** display window, together with the messages associated with the active failures, if required by the maintenance personnel (by pressing **FAULT ISOLATE** pushbutton switch on the **GPCU** aircraft on the ground.

(c)Non Volatile Memory ; list of the messages generated by the **BITE** (Ref. Fig. 020)



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Non Volatile Memory
Figure 020

The codes of the messages generated by the GCU BITE are stored in a Non Volatile Memory (NMV), i.e. the data is kept even when supply to the GCU is cut.
The NVM is organized as follows :
There are 64 storage locations of 8 bits (1 word) each.
Each of the two last locations has a particular function :
- location 63 is the BITE message memory :
  the data stored inside will indicate whether the GCU has recorded (in locations 1 to 62) a failure message code during the flight, and thus permits the GPCU BITE DISPLAY MFA located on the Maintenance Panel to be activated when necessary.
- location 64 is a flight counter used to indicate how many flights have been logged since the last automatic periodic is data is necessary to initiate the automatic periodic test every seven flights (Ref. para. (g)).
- the 62 other locations (1 thru 62) are used to store failure message codes and control codes for the NVM.

The list of messages generated by the GCU BITE and which can be displayed on the alphanumeric display window of the GPCU is given below in sub-paragraphs 1, 2, 3.

NOTE 1 : Any GCU internal failure is indicated by an implicit message of the type : "GCU FAILED CODE XX", XX being the code of the message (in hexadecimal). But any defect external to the GCU (internal to the generator or affecting the wiring) is indicated by an explicit message.

NOTE 2 : Though this paragraph deals with the self-monitoring and testing of the main generation (IDG1 and IDG2 network), the following list presents all the messages that can be generated by the BITE of the GCU whether the GCU is associated with a main generation network or with the auxiliary generation. The messages specific to the main generation are identified by (IDG) at the end of the code, and those particular to the auxiliary generation by (APU) ; the other messages are common to both types of generation.

1 Messages generated in case of tripping of a protection (Ref. para. (a))

* Messages indicating the type of protection having caused the generator de-activation.

CODE (in hexadecimal)	MESSAGE DISPLAYED
DA	DP TRIP
DD (APU)	APU SHUTDOWN TRIP
DE (IDG)	DISCONNECT TRIP
E0	OVER VOLT TRIP
E2	UNDER VOLT TRIP
E5	OVER FREQ TRIP
E6	UNDER FREQ TRIP
E8 (IDG)	FIRE TRIP
E9	SHORTED PMG TRIP
EA	GEN DIODE/FIELD TRIP

These messages appear explicitly.

**Messages indicating the localization of the failure having activated the protection
. Failures internal to the GCU

	CODE	NATURE OF THE FAILURE
R	95 (APU)	APU READY SENSE
R	97 (IDG)	SPEED SENSE
R	98	FAILED VFLD (+) SENSE OR HIGH PMG
R	99	VLFD SENSE
R	9A	IFLD OR VOLTAGE REGULATOR CIRCUIT
R	9B	VFLD (+) OR GCR AUX
R	9C	IFLD SENSE
R	9D	+12V POWER
R	A0	VFLD (-) SENSE
R	A1	+5V POWER
R	A2	CIRCUIT BREAKER SENSE
R	A3	POWER SUPPLY AVERAGE
R	A4	SLOW A/D CONVERTER
R	A5	GCR OR GCR AUX
R	A6	CT LOOP COMMON VOLTAGE SENSE
R	B0	OIL OUT BULB AMPLIFIER
R	B1	OIL OUT BULB SENSE CIRCUIT
R	B2	+28V (PMG A)
R	B3	+28V (PMG B)
R	B4	+28V COMMON (PMG A, PMG B, BACKUP)
	B5	DP CURRENT
	B6 (IDG)	DISCONNECT SWITCH SENSE
	B8	BAD VOLTAGE REGULATOR OUTPUT STAGE
	B9	FIELD VOLTAGE SENSE OR CURRENT SENSE
	BA	BAD OUTPUT STAGE
	BB	PEAK HOLDING CIRCUIT
	BC	CURRENT/DP SENSE
	BD	SPMG SENSE
	BE	FREQUENCY SENSE
	BF (IDG)	MPU SPEED SENSE
	C0 (IDG)	FIRE SWITCH SENSE
	C1	PROCESSOR FAILURE
	C2	WATCH DOG PROTECTION
	C3	BITE BYPASSED - 3 TRAP FLAG
	C4	BITE BYPASSED - BACKGROUND
	C5	NVM FAILED
	C6	BITE CURRENTLY BYPASSED

The messages are displayed under the form : "GCU FAILED CODE XX" because they correspond to GCU internal failures
.. Failures external to the GCU

	CODE	MESSAGE DISPLAYED
R	C7 (IDG)	LOW OIL PRESSURE
R	C9 (APU)	APU READY/WIRING
R	CA (IDG)	MPU/WIRING
	CC	WRONG PHASE SEQ
	CE	CIRCUIT BREAKER OPEN
R	CF	CT LOOP GND
R	D3 (IDG)	COOLER
R	D4 (IDG)	IDG HIGH DELTA TEMP
R	D6 (IDG)	IDG OVERTEMP
R	D8 (APU)	APU OVERTEMP
	DB	ZONE 1 DP
	DC	ZONE 2 DP
	DF (IDG)	IDG DISCONNECT FAILED
	E1	FIELD/WIRING
	E3	GCU/FIELD/WIRING
	E4	OPEN POR/FDR GEN
	E7 (IDG)	IDG/PMG WIRING
	EB	OPEN CT
	EC	GEN DIODE
	ED	PMG/FIELD/WIRING/GCU
	EE (IDG)	GCU/BTC
	EF	GLC/CONTROL CIRCUIT

The messages are displayed explicitly because they correspond to GCU external failures (except those of codes E3, ED and EE which may correspond to GCU internal failures ; message with code CE corresponds to the opening of the circuit breaker located on GCU face).

NOTE : In case of protection activation, two messages are generally displayed on the GCU display window :

- a message indicating the nature of the protection having caused the generation de-activation (Ref. 1 *)
- a message indicating the localization of the failure having initiated the protection sequence ; the failure is either internal to the GCU (Ref. 1 **.) or external to the GCU (Ref. 1 **..).

Only the three messages coded : CC, CE and EF ("WRONG PHASE SEQ", CIRCUIT BREAKER OPEN" and GLC/CONTROL CIRCUIT") may appear without any other message.

2 Messages generated in case of passive failure detection (Ref. para. (b))

* Failure internal to the GCU

CODE	NATURE OF THE DISPLAY
94 (IDG)	LOW OIL PRESSURE SW SENSE
95 (APU)	APU READY SENSE
96	PHASE SEQ SENSE
97 (IDG)	SPEED SENSE

	CODE	NATURE OF THE DISPLAY
	98	FAILED VFLD (+) SENSE OR HIGH PMG
	99	VLFD SENSE
	9A	IFLD OR VOLTAGE REGULATOR CIRCUIT
	9B	VFLD (+) OR GCR AUX
	9C	IFLD SENSE
	9D	+12V POWER
	9E	PR OR PR AUX OR AUX SENSE
	9F	GLC MONITOR SENSE
	A0	VFLD (-) SENSE
	A1	+5V POWER
	A2	CIRCUIT BREAKER SENSE
	A3	POWER SUPPLY AVERAGE
	A4	SLOW A/D CONVERTER
	A5	GCR OR GCR AUX
	A6	CT LOOP COMMON VOLTAGE SENSE
	A7 (IDG)	COOLER VALVE MONITOR SENSE
	A8 (IDG)	COOLER VALVE VOLTAGE SENSE
	A9	A/D GROUND TEST
	AA (IDG)	OIL IN BULB AMPLIFIER
	AB (IDG)	OIL IN BULB SENSE CIRCUIT
	AC (IDG)	OIL IN BULB AMPLIFIER
	AD (IDG)	OIL IN BULB SENSE CIRCUIT
	AE	OIL OUT BULB AMPLIFIER
	AF	OIL OUT BULB SENSE CIRCUIT
	B0	OIL OUT BULB AMPLIFIER
	B1	OIL OUT BULB SENSE CIRCUIT
	B2	+28V (PMG A)
	B3	+28V (PMG B)
	B4	+28V COMMON (PMG A, PMG B, BACKUP)
R	C1	PROCESSOR FAILURE
R	C2	WATCH DOG PROTECTION
R	C3	BITE BYPASSED - 3 TRAP FLAG
R	C4	BITE BYPASSED - BACKGROUND
R	C5	NVM FAILED
R	C6	BITE CURRENTLY BYPASSED

These messages are displayed under the form : "GCU FAILED CODE XX" because they correspond to GCU internal failures.

** GCU external failures

	CODE	MESSAGE DISPLAYED
	C7 (IDG)	LOW OIL PRESSURE
	C8 (IDG)	OIL PRESSURE SW/WIRING
	C9 (APU)	APU READY/WIRING
	CA (IDG)	MPU/WIRING
	CB	INTERMITTENT SERIAL LINK
R	CC	WRONG PHASE SEQ

	CODE	MESSAGE DISPLAYED
R	CE	CIRCUIT BREAKER OPEN
	CF	CT LOOP GND
	D0 (IDG)	COOLER VALVE/WIRING OPEN
	D1 (IDG)	OIL IN BULB/WIRING
	D2 (IDG)	OIL OUT BULB/WIRING
	D3 (IDG)	COOLER
	D4 (IDG)	IDG HIGH DELTA TEMP
	D5 (IDG)	IDG BULB TOLERANCE
	D6 (IDG)	IDG OVERTEMP
	D7 (APU)	APU TEMP BULB/WIRING
	D9 (IDG)	COOLER VALVE SUPPLY/SHORT
	E3	GCU/FIELD/WIRING
	EE	GCU/BTC
	EF	GLC/CONTROL CIRCUIT
	NONE	NO RESPONSE FROM CONTROL

These messages are displayed explicitly because they correspond to GCU external failures

3 Messages which can be generated only during periodic tests, manually initiated (Ref. para. (f)) or automatic (Ref. para. (g))

CODE	NATURE OF THE DEFECT
80	PHASE C VOLTAGE SENSE
81	PHASE B VOLTAGE SENSE
82	PHASE A VOLTAGE SENSE
86	DP CURRENT SENSE
87	LOW OIL PRESSURE SWITCH SENSE
88	GENERATOR CONTROL SWITCH SENSE
89	GCU POSITION SENSE
8A	PHASE SEQUENCE SENSE
8B	SPMG SENSE
8C	FIRE SWITCH SENSE
8D	APU READY SENSE
8E	DISCONNECT SWITCH SENSE
8F	FREQUENCY SENSE
90	SPEED SENSE
91	DP/BTC RESET SWITCH

These messages are displayed under the form "GCU FAILED CODE XX" because they correspond to GCU internal failures.

(d) Definition of a flight and flight logging

A "flight flag" (control code FE) enabling flight logging (Ref. para. (c)) is stored in location 64 of GCU NVM each time a new flight begins.

One flight is defined as follows (principle) :

new flight : aircraft landing followed by at least one engine shutdown, then by both engines running.

The purpose of the "flight flag" is to partition the BITE message codes

stored in the NVM thus forming groups of codes, one per flight : the NVM can store up to seven (7) groups of BITE message codes (one group for the current flight and the six others for the six preceding flights) ; each corresponding message assembly may be displayed on the alphanumeric display of the GPCU if required by the maintenance personnel (by pressing FAULT ISOLATE pushbutton switch on the GPCU).

(e) Transmission of the BITE messages from the GCU to the GPCU

As soon as the aircraft touches the ground, at the end of the flight, communication is established between the GPCU and GCU (GCU 1, 2 or 3).

NOTE 1 : As long as the aircraft flies, there is no communication between the control units.

2 : There cannot be communication between two GCUs, but only between one GCU and the GPCU.

During the communications each GCU transmits to the GPCU, the data stored in location 63 of the NVM (Ref. para. (c)) and any BITE message recorded during the flight is thus indicated ; if it is the case for at least any of the three GCUs, or if the GPCU has recorded a BITE message, GPCU BITE DISPLAY MFA (located on Maintenance Panel) is activated.

Consequently if an active or passive failure of the electrical generation has occurred during a flight, the maintenance personnel is informed. It is then possible to know the nature of the failure(s) by pressing FAULT ISOLATE pushbutton switch on the face of the GPCU (this action has an effect with aircraft on ground only) ; when the pushbutton switch is pressed, each control unit transmits to the GPCU, the failure messages stored in the NVM (if applicable) via a serial data link connecting each GCU to the GPCU ; these messages, together with those stored in the GPCU NVM, are displayed on the GPCU alphanumeric display window in the order in which their codes have been stored in NVM of the control unit (GCU 1, 2 or 3 or GPCU).

When all the messages dealing with the current flight (i.e. the last flight) have been displayed, the messages which may have been stored during the preceding flight can be displayed by pressing again FAULT ISOLATE pushbutton switch. This can be repeated seven (7) times, each time the messages of the preceding flight being dealt with (the NVM having a "7" flight capacity", Ref. para. (d)).

(f) GCU circuitry verification test (periodic test)

When PERIODIC TEST pushbutton switch on the face of the GPCU is pressed (this action has an effect with aircraft on ground and engines shut down), a verification test of the GCUs and GPCU circuitry is initiated to check for correct operation : at each control unit level, the BITE performs an end to end test of the control unit and all the anomalies detected by the test are displayed, in BITE message form, on the GPCU display window.

This test checks the following GCU circuits :

- digital inputs/outputs
- current and voltage inputs
- frequency sense circuits
- speed measurement circuits

The test consists in applying stimuli to the circuits concerned and analyzing their response.

The results of the test are stored in the NVM of the GCU and joined to the data concerning the current flight.
The whole data (current flight + test) are then transmitted to the GPCU which display them in message form on the displays window.

(g)Automatic periodic test

An automatic periodic test of the GCUs and GPCU is performed every seven (7) flights, aircraft on the ground and engines shut down.
Except for the initialization mode -automatic and every seven flights for the automatic periodic test, manual for the periodic test-, the automatic periodic test is analogous to the periodic test :
- the same software and hardware are used for the test
- the same circuits are checked, i.e. for the GCU :
  . digital inputs/outputs
  . current and voltage inputs
  . frequency sense circuits
  . speed measurement circuit.

Moreover, if one or more failure messages are generated during the GCU automatic periodic test, they are stored in the NVM of the GCU but not displayed ; however, the maintenance personnel will be warned the GPCU BITE DISPLAY MFA on Maintenance Panel (this MFA is systematically activated when a failure message is recorded by any of the GCUs or GPCU).
As for the manual periodic test (Ref. para. (f)), the messages generated during the automatic periodic test are grouped with those dealing with the current flight and displayed together on the GPCU display window by pressing FAULT ISOLATE pushbutton switch on the GPCU.
NOTE : Whatever the result of the automatic periodic test may be, failure detected or not, a data appears on the display (if FAULT ISOLATE pushbutton switch is pressed) indicating that an automatic periodic test has been carried out at the end of the current flight. The data is displayed in the form : "AUTO PER TEST DONE THIS FLIGHT".

(6)General characteristics

References : Sundstrand P/N 740120C

(a)Voltage regulation in (balanced loads).

Voltage at the point of regulation
- 115V ±1V for a load from 0 to 90KVA
- 115V ±1.5V for a load from 90 to 112.5KVA
- 115V ±2V for a load from 112.5 to 150KVA

(b)Protections

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATIONS
- OF	431/435Hz	4 ±1sec.	GCR and PR relay opening + VR S/D
- UF	361/365Hz	4 ±1sec.	id.
- OV	128.5/131.5V	Inv. TD Ref. Refer to figure	id.
- UV	96/104V	4.5 ±0.5sec.	id.
- DP	40/50A	37.5 ±2.5 ms	Sequential action on the GCR, PR and BTC within 120 ms
- SRD	Refer to figure	3 ± 0.5 sec	GCR and PR relay opening + VR S/D

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATIONS
- SPMG	Refer to figure	2 ± 0.5 sec	id.
- IPS	Refer to figure	-	Prevents PR relay closure
- Computer failure	Refer to figure	-	GCR and PR opening

Table 001 and (Ref. Fig. 021, 017, 016)
(Ref. Fig. 015, 011)

(c)Various controls

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATIONS
- DISC	Refer to figure	35ms	GCR and PR relay opening
- FS	Refer to figure	35ms	id.
- US	4290/4350 rpm	80ms	PR relay opening
- Low input Speed	≅ 325/345 Hz	-	De-energization by VR S/D
-oil cooler	127/104°C	-	Control of IDG air/oil cooler valve (Ref. 24-11-00, P. Block 1)

Table 002 and (Ref. Fig. 011)

(d)Warnings

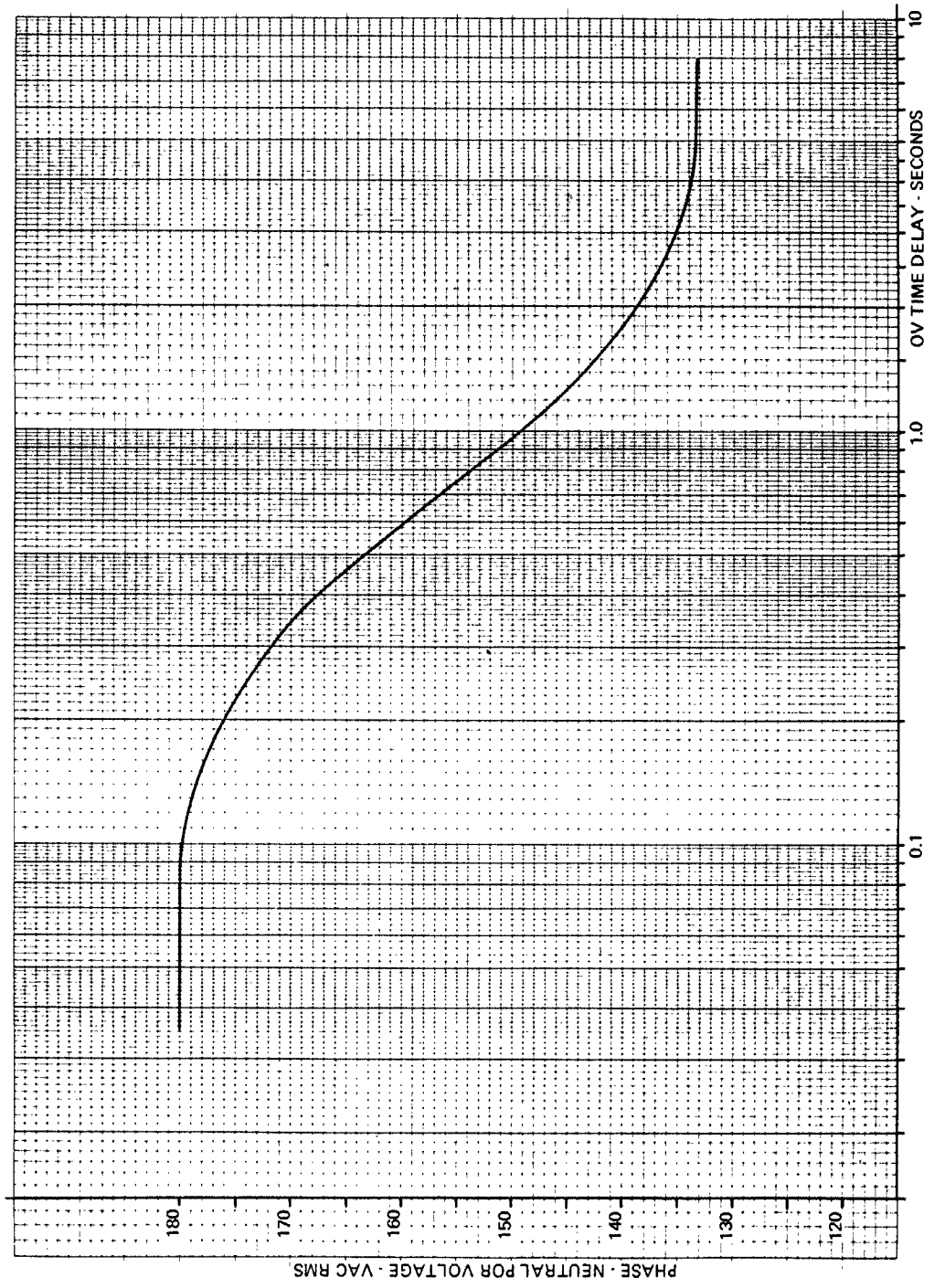
FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATIONS
- FAULT	Refer to figure	-	For ref. only : connected to the PR relay and line contactor
- OC	Generator load >277 ±13A	13 ±3sec.	GEN HI warning light control (Ref. 24-26)
- OVHT	OOT > 185 ±5°C	-	IDG FAULT warning light control when activated (Ref. 24-26)
- Low IDG oil pressure	140 ± 25 psi	-	IDG FAULT warning light control (Ref. 24-11)

Table 003 and (Ref. Fig. 006)

(e)Indications

- generator load (Ref. Fig. 019)
- IDG oil temperature (See 24-11-00, P. Block 1)

4. Transfer Circuit



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Inverse Time Delay Characteristics for Overvoltage Protection
Figure 021

The transfer circuit enables either or both distribution network to be supplied from any main, auxiliary or ground generation source.
Its control is fully automatic and only depends on the availability of these different supply sources, with a clearly defined order of priority.

A. Control Circuit (Ref. Fig. 022, 023)

Transfer contactor No.1 closes :

- either when generator No.1 is not available (GCL1 open and controlled open) to supply network 1 from another source (generator 2, auxiliary generator or ground power unit).
- or to be able to supply network 2 from generator 1 (GCL 1 controlled closed) under the following conditions :
  . if generator 2 is not available (GLC open)
  . and if the ground power unit is not available (EPC open and controlled open),
  . and if the auxiliary generator is not available (GLC 3 open and controlled open).

The control circuit of transfer contactor 2 is symmetrical.

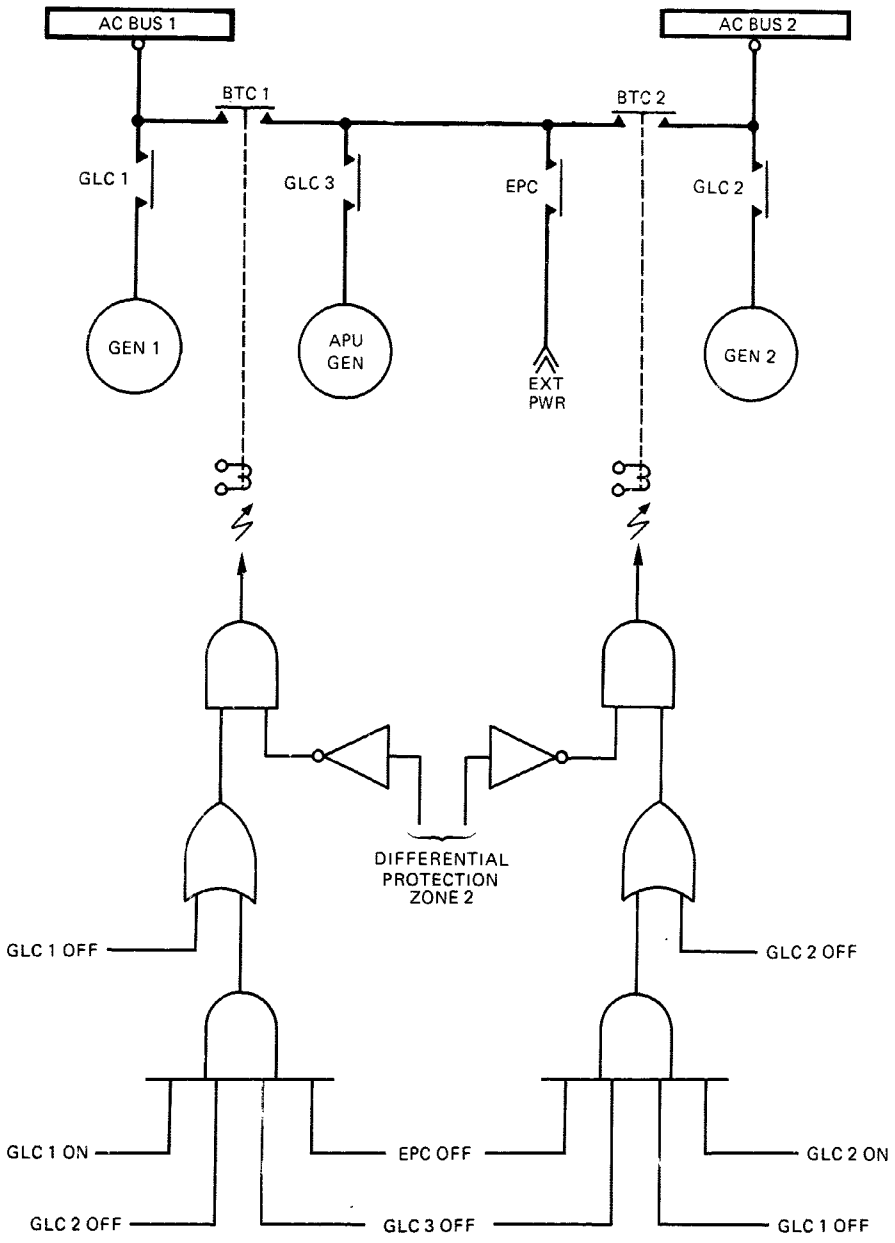
NOTES : - Closure of the transfer contactor is also subject to zone 2 differential protection triggering (Ref. 2 (3) (a3))
- when a generator is energized, the following occurs in sequence :
  . the corresponding transfer contactor opens
  . its line contactor closes

B. Network Supply Priority

A network is supplied in the following order of priority :

- by its generator
- by the ground power unit
- by the auxiliary generator
- by the second generator

NOTE : Refer to 24-23-00, P. Block 1 for the supply order of priority between the auxiliary generator and the ground power unit.



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AC Generation BTC Controls
Figure 022

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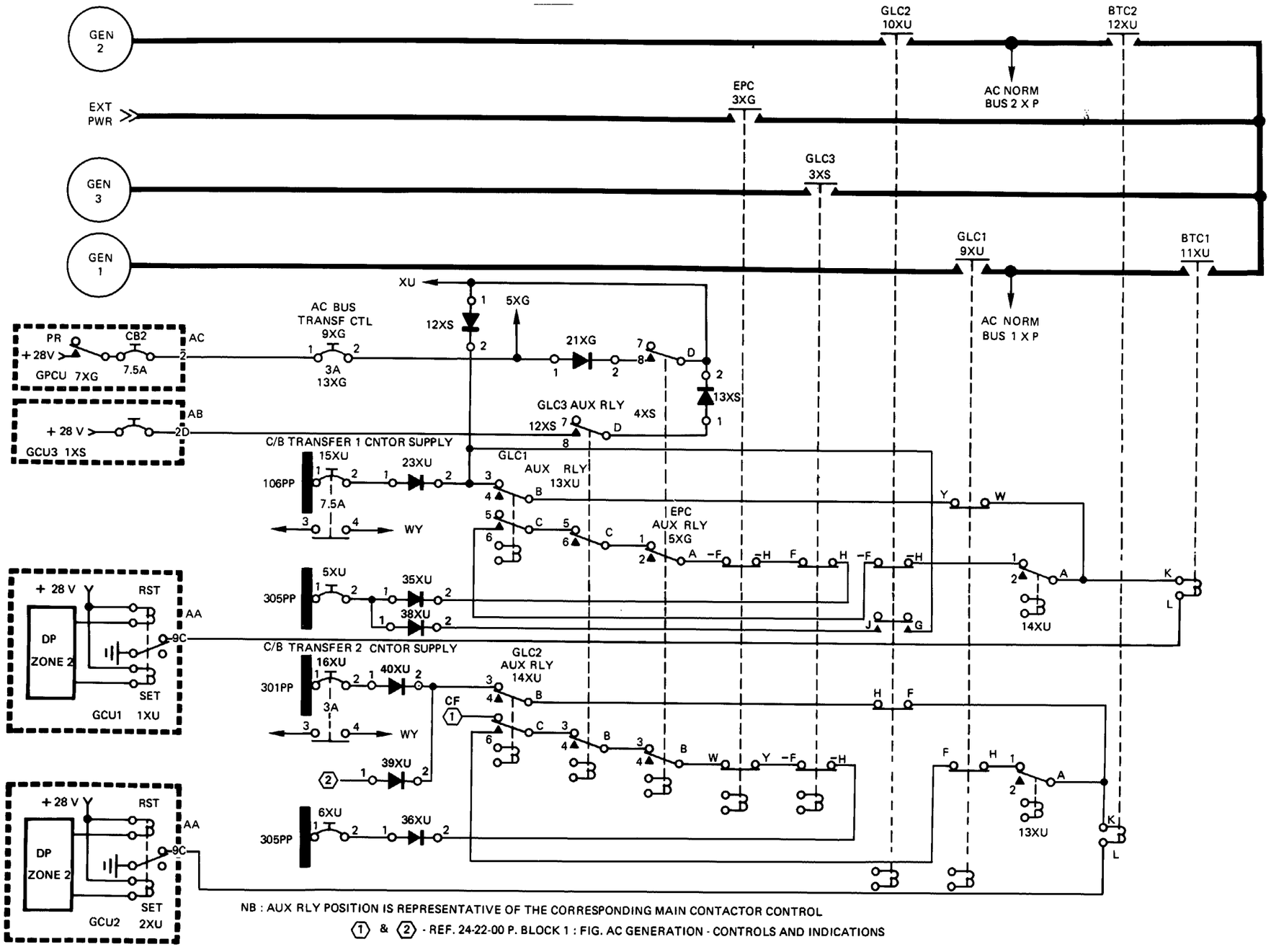

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AC Generation BTC Controls
Figure 023

GENERATOR CONTROL UNIT 1XU (2XU) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control

2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
NOTE : It is recommended that GCUs be removed/installed only after the appropriate engine has been shut down.

(1) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2) On panel 424VU
- Make certain that GEN1 and GEN2 pushbutton switches are released (OFF legends are ON).

(3) Open access door 121BL.

(4) In avionics compartment on GPCU 7XG, perform a PERIODIC TEST and note system state.
CAUTION : DO NOT PERFORM A "MEMORY CLEAR" ON GPCU 7XG BEFORE REMOVAL OF GCU NOT TO ERASE GCU NVM.

(5) On flight compartment overhead panel 424VU, press and release ELEC PWR/EXT PWR pushbutton switch 10XG :
- AVAIL legend comes on
- ON legend goes off.

(6) Open, safety and tag the following circuit breakers :

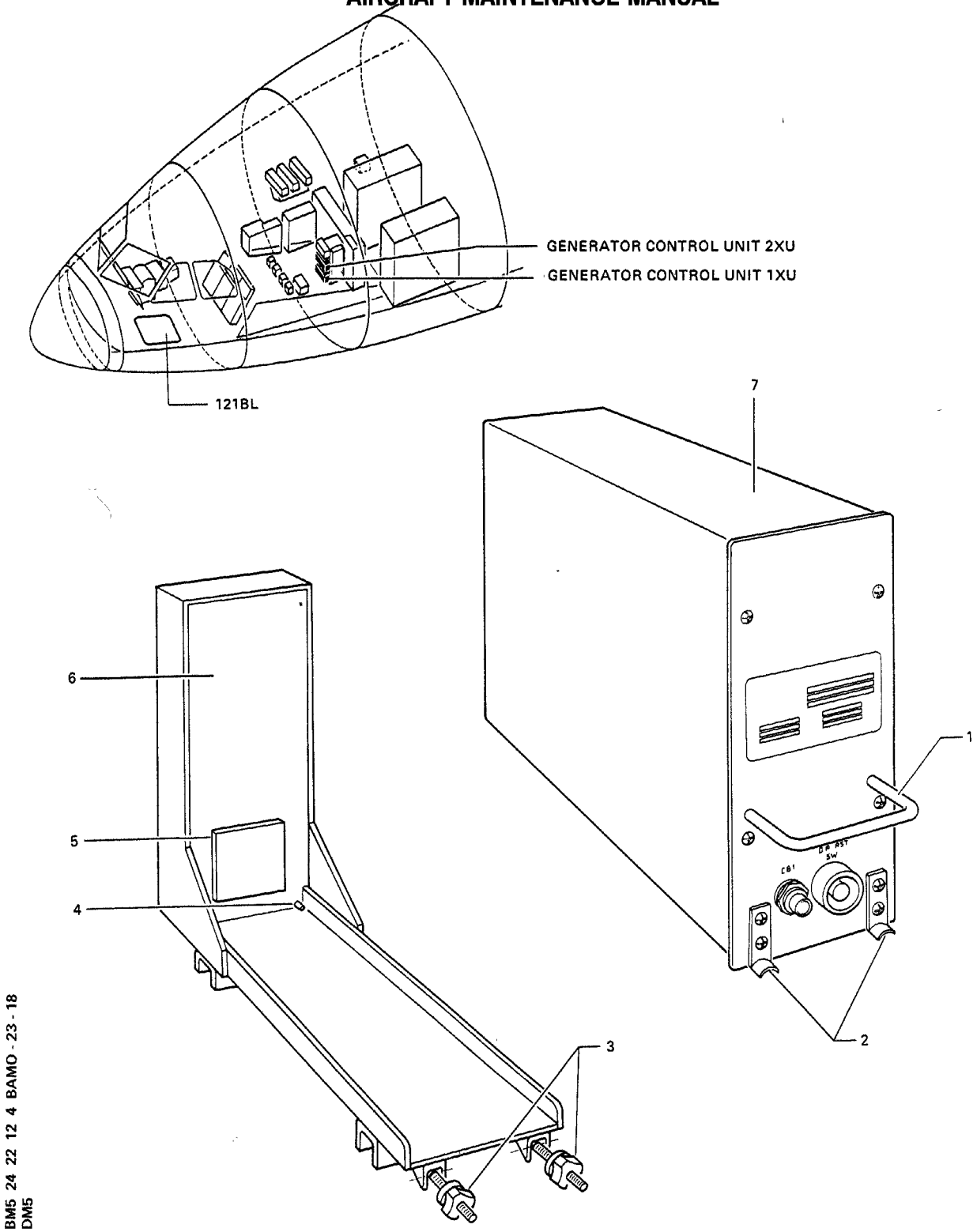
(a) For GCU1 (1XU)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC - GCU WARN - GEN 1	5XU	333/T81
133VU	ELEC - XFR1 CNTOR CTL	15XU	332/U81
133VU	ELEC - GEN 1 COOL VALVE	1XT	332/U80
22VU	ELEC - DISC IDG 1	3XT	206/D20

(b) For GCU2 (2XU)

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC - GCU WARN - GEN2	6XU	333/T82
133VU	ELEC - GEN2 - GCU BACK UP SUPPLY	18XU	331/V81
133VU	ELEC - GEN2 - COOL VALVE	2XT	331/V80
133VU	ELEC - XFR2 CNTOR CTL	16XU	332/U85
22VU	ELEC - DIS IDG 2	4XT	206/D21

B. Removal



AC Generation - GCU 1XU and 2XU - Avionics Compartment
Figure 401

(1)Loosen the two locking screws (3).
(2)Lower the two locking screws (3) to free attachment lugs (2).
(3)Using handle (1), pull the generator control unit (7) out until connector (5) and centering pins (4) disengage.
(4)Remove control unit from mount (6).
(5)Install plastic shipping cap on the electrical connector of the unit to protect the connector from damage and contamination.

C. Installation
(1)Remove plastic shipping cap from the electrical connector.
(2)Slide generator control unit (7) along mount (6).
(3)Push the generator control unit (7) up to the end of the mount (6) to engage connector (5) and centering pins (4).
(4)Engage locking screws (3) with the attachment lugs (2).
(5)Tighten locking screws (3).

R D. Test
(1)Remove safety clips and tags and close circuit breakers :
(a)For GCU1 (1XU) : 5XU, 15XU, 1XT, 3XT
(b)For GCU2 (2XU) : 6XU, 18XU, 2XT, 4XT and 16XU
(2)In flight compartment, overhead panel, press ELEC PWR/EXT PWR pushbutton switch 10XG (ON legend comes on).
(3)Perform a MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).
R (4)Perform an operational test of the GCU (Ref. 24-41-00,
R P. Block 501).

R E. Close-Up
R (1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (2)Close access door 121BL.

GEN 1 (2) LINE CONTACTOR 9XU (10XU) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Torque Wrench
Referenced Procedures	
- 24-23-00, P. Block 301	Auxiliary AC generation
- 24-27-00, P. Block 501	AC Monitoring and Indicating *
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : THIS IS TO AVOID 115 VOLT ON CONTACTORS WHICH ARE UPSTREAM OF EXT PWR LINE CONTACTOR.

(2) Open access door 121BL

(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4) In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting APU start.

(5) In avionics compartment, remove GEN1, GEN2 doors from of AC power center 101VU.

B. Removal

NOTE : Removal procedure is identical for line contactors 9XU and 10XU.

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1) Disconnect connector (5).

(2) Remove nuts (3) and remove power connections.

(3) Remove the four screws (1) and washers (2).

(4) Retain contactor (4).

C. Installation

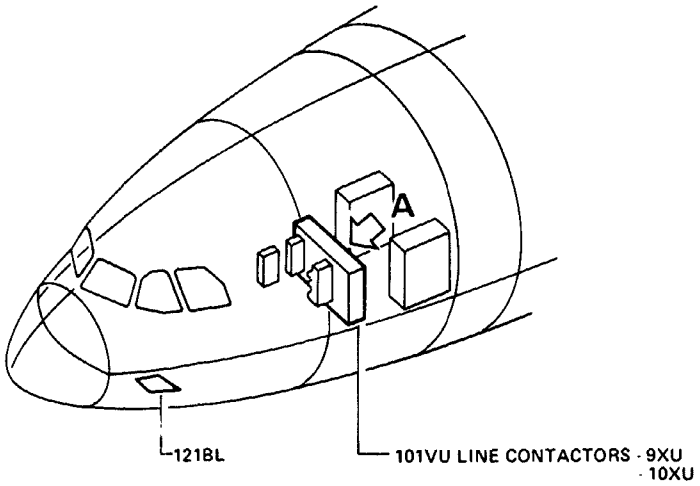
NOTE : Installation procedure is identical for line contactors 9XU and 10XU.

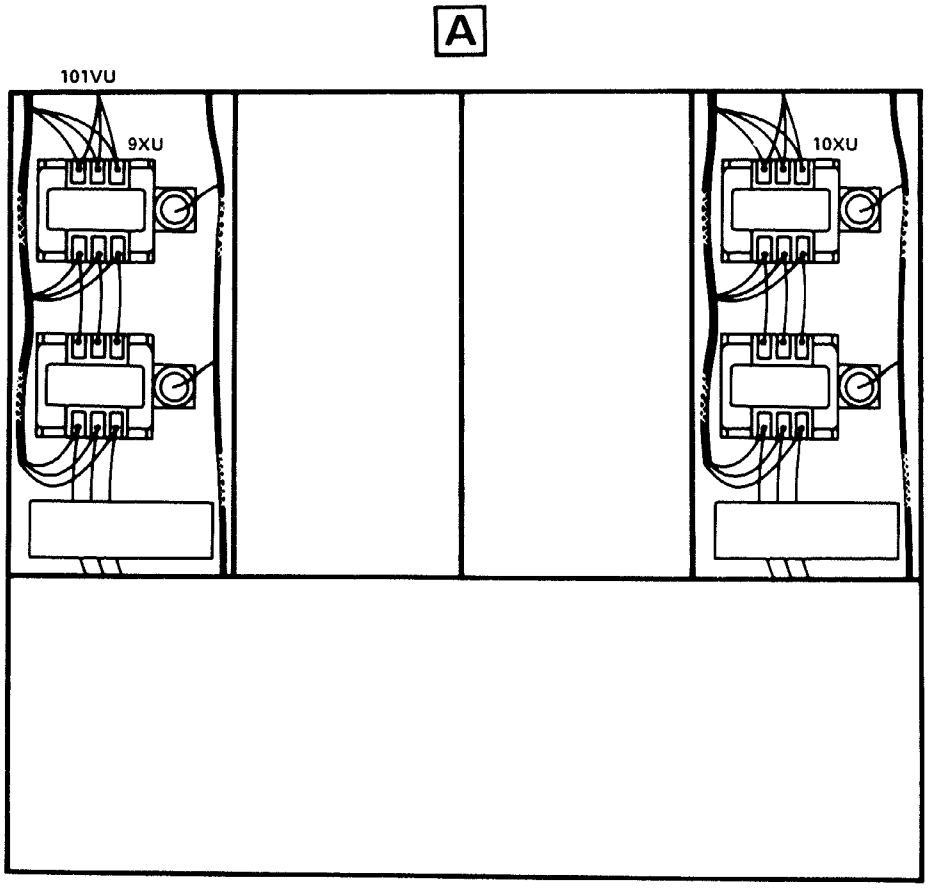
CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1) Position contactor (4) and secure with the four screws (1) and washers (2).

R (2) Secure the different power connections with nuts (3).

R (3) TORQUE nuts (3) to between 0.9 and 1 m.daN (79.65 and 88.49 lbf.in.).





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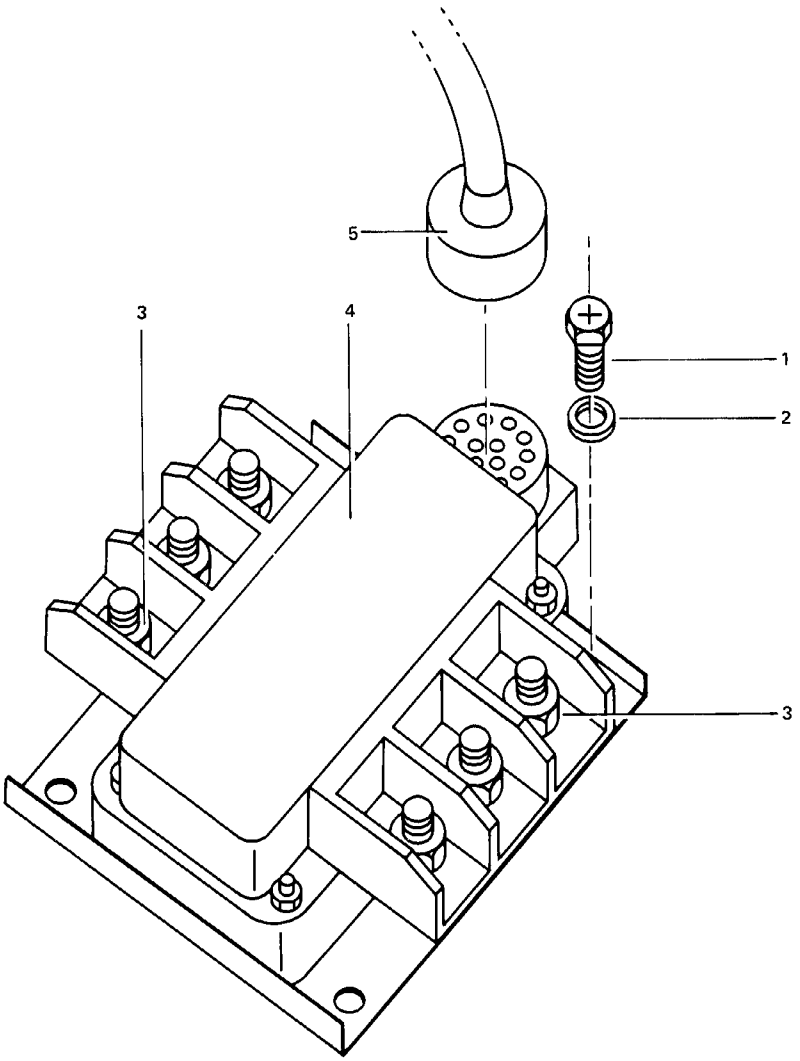
GEN1 (2) Line Contactor - Location
Figure 401



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GEN1 (2) Line Contactor
Figure 402

R (4)Connect connector (5).

D. Test
Check AC indicating system for correct operation (Ref. 24-27-00, P. Block 501). *

E. Close-Up
(1)Install door(s) on AC power center 101VU.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panel 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

WARNING : MAKE SURE THAT NO AC OR DC POWER SOURCE IS CONNECTED TO THE AIRCRAFT ELECTRICAL CIRCUITS.
THERE IS A RISK OF ELECTROCUTION IF THE AC OR DC POWER STAYS CONNECTED.

1. Equipment and Materials

A. For current transformer (21XU) :

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notices
(3)	Blanking Caps
(4)	Cable Ties
Referenced Procedures	
- 21-21-00, P. Block 501	Flight Compartment and Electronics Racks Air Distribution (Optional)
- 21-23-00, P. Block 501	Electronics Racks Air Extraction (Optional)
- 21-55-00, P. Block 501	Ground Cooling (Optional)
- 24-24-00, P. Block 501	Emergency AC Generation
- 24-25-00, P. Block 501	AC Essential Generation Switching (Optional)
- 24-27-00, P. Block 501	AC Monitoring and Indicating
- 24-32-00, P. Block 501	DC Normal Generation
- 24-41-00, P. Block 301	AC External Power Control
- 24-56-00, P. Block 501	Galley Supply
- 28-21-00, P. Block 501	Fuel Pump System (Optional)
- 29-21-00, P. Block 501	Green Auxiliary Power
- 30-42-00, P. Block 501	Windshield Panel Anti Icing and Defogging

B. For current transformer (22XU) :

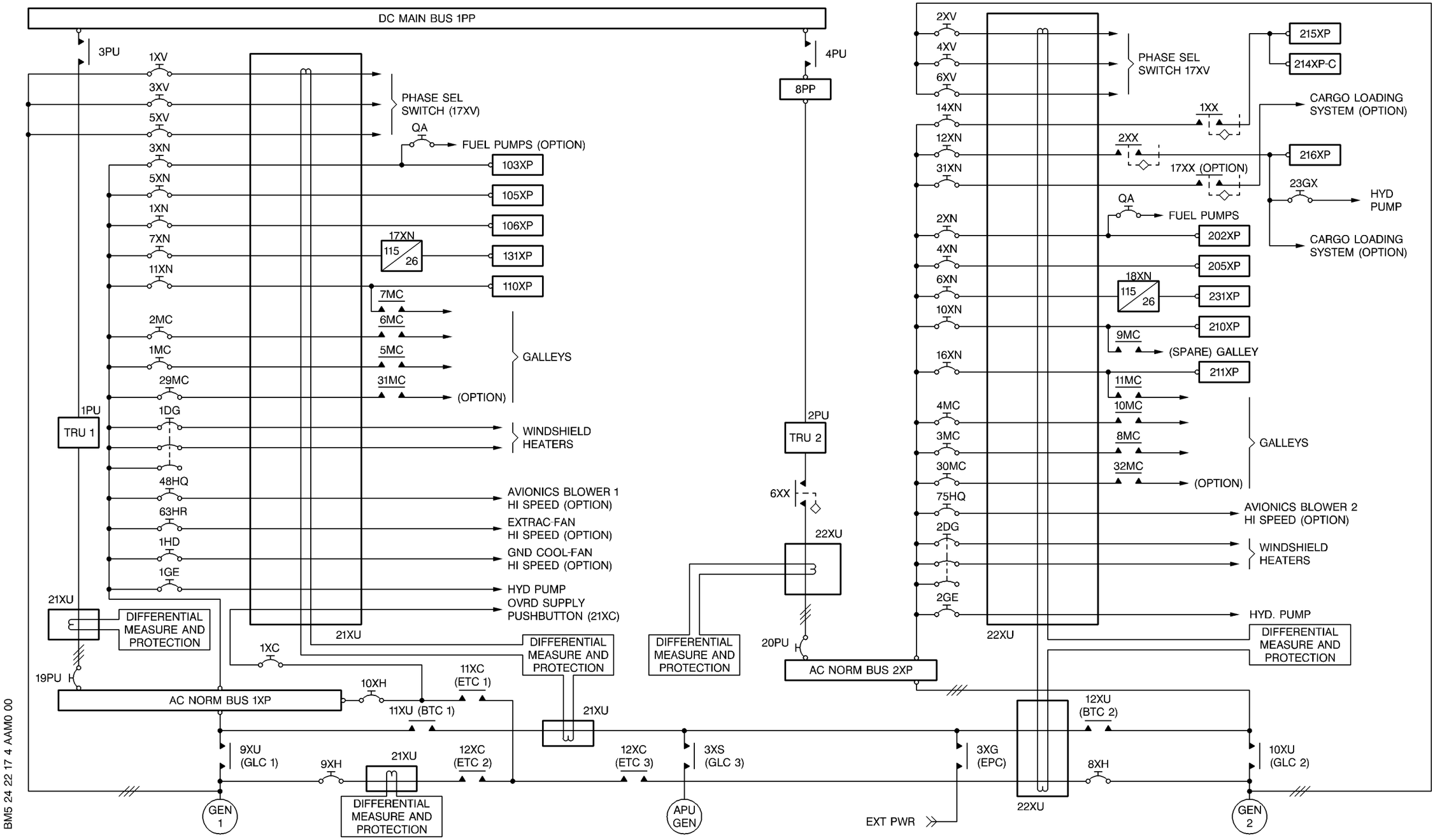
ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notices
(3)	Blanking Caps
(4)	Cable Ties
Referenced Procedures	
- 21-21-00, P. Block 501	Flight Compartment and Electronics Racks Air Distribution (Optional)
- 24-24-00, P. Block 501	Emergency AC Generation
- 24-27-00, P. Block 501	AC Monitoring and Indicating
- 24-32-00, P. Block 501	DC Normal Generation
- 24-41-00, P. Block 301	AC External Power Control
- 24-56-00, P. Block 501	Galley Supply
- 28-21-00, P. Block 501	Fuel Pump System (Optional)
- 29-21-00, P. Block 501	Green Auxiliary Power
- 30-42-00, P. Block 501	Windshield Panel Anti Icing and Defogging

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up
(1)In flight compartment, on overhead ELEC PWR panel 424VU, make sure these pushbutton switches are released : BAT OVRD, BAT 1, 2, 3, OVRD SUPPLY 1, 2, GEN 1, GEN 2, APU GEN, EXT PWR.
(2)In flight compartment, on overhead ELEC PWR panel 424VU, put a warning notice to tell persons not to operate the pushbutton switches.
(3)In flight compartment, on overhead panel 429VU, APU section, install a warning notice prohibiting APU start.
(4)Put a warning notice in position on the door 121EL to tell persons not to connect the external power connector to the aircraft EXT PWR receptacle.
(5)Open access door 121BL.
(6)In avionics compartment, remove from AC power center 101VU :
(a)for current transformer (21XU) :
- GEN 1 door
(b)for current transformer (22XU) :
- GEN 2 door.

B. Removal
NOTE : This procedure is for 21XU. For 22XU, use the indications between the parentheses.
CAUTION : MAKE MATCH MARKS ON ALL THE ELECTRICAL WIRES BEFORE YOU DISCONNECT THEM. INCORRECT CONNECTION OF WIRES WILL CAUSE DAMAGE TO EQUIPMENT.
(1)On panel 101VU, identify all the circuit breakers connected to the AC BUS 1(2) busbar 1XP (2XP).
(2)Disconnect the wires connected to pin 2 of these circuit breakers.
NOTE : You must remove all the wire bundles between the circuit breakers and the current transformer. Identify the wires before the removal.
(3)Remove the nuts (2) and the feeders (3) from the contactor (1).
NOTE : You must remove all the feeders between the contactor and the current transformer.
Identify the feeders before the removal.
(4)Record the location and the color of the wire bundles on the current transformer (4).
(5)Disconnect the electrical connector (5) from the contactor (1).
(6)Put blanking caps on the disconnected electrical connector and electrical receptacle.
(7)Remove the four bolts (6) and washers (7) from the current transformer (4).
(8)Cut the cable ties and move the current transformer (4) up along the wire bundles to remove it.

C. Installation
NOTE : This procedure is for 21XU. For 22XU, use the indications between the parentheses.
(1)Put the disconnected wire bundles through the current transformer (4). Make sure that the location and the colors of the wire bundles agree with



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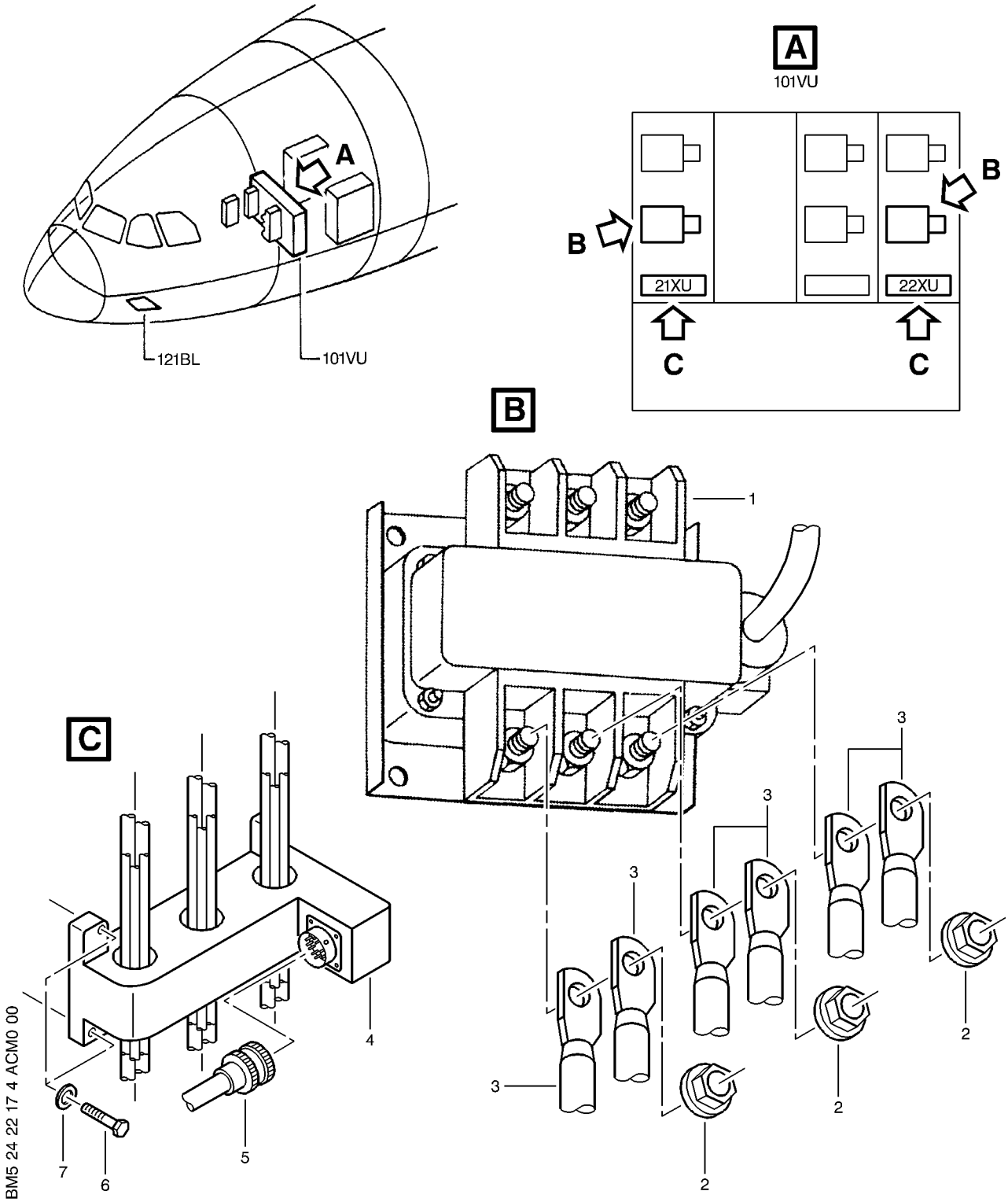
AC Current Transformer - Block Diagram
Figure 401



Current Transformer (21XU and 22XU)
Figure 402

those recorded at removal.
(2)Move the current transformer (4) along the wire bundles.
(3)Install the washers (7) and the bolts (6) on the current transformer (4) and tighten them.
(4)Remove the blanking caps from the electrical connectors.
(5)Make sure that the electrical connectors are clean and in the correct condition.
(6)Connect the electrical connector (5) to the current transformer (4).
NOTE : Between the contactor (1) and the current transformer (4) identify and attach the wire bundles.
(7)Install the feeders (3) and the nuts (2) on the contactor (1) and tighten them.
NOTE : Between the circuit breakers and the current transformer (4), identify and attach the wire bundles with cable ties.
(8)On panel 101VU, connect all the wires at pin 2 of the circuit breakers to the AC BUS 1(2) busbar 1XP (2XP).
NOTE : Make sure that the location of the wires agrees with that recorded at removal.

D. Preparation before Test
(1)Make sure that the work area is clean and clear of tool(s) and other items.
(2)In avionics compartment, install on AC power center 101VU :
(a)for current transformer (21XU) :
- GEN 1 door
(b)for current transformer (22XU) :
- GEN 2 door.
(3)Close access door 121BL.

E. Test
(1)For current transformer (21XU) :
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Carry out the operational test of the static inverter (Ref. 24-24-00, P. Block 501).
(c)Carry out the operational test of the AC indicating system (Ref. 24-27-00, P. Block 501).
(d)Carry out the operational test of the DC normal generation (Ref. 24-32-00, P. Block 501).
(e)Carry out the operational test of the galley shedding system (Ref. 24-56-00, P. Block 501).
(f)Carry out operational tests of the Green auxiliary power indicating circuit and electric pump operation (Ref. 29-21-00, P. Block 501).
(g)Carry out operational tests of the windshield panel anti icing and defogging system (Ref. 30-42-00, P. Block 501).
(h)If applicable, carry out the operational test of the electronics racks air distribution (Ref. 21-21-00, P. Block 501).
(j)If applicable, carry out the operational test of the electronics racks air extraction (Ref. 21-23-00, P. Block 501).
(k)If applicable, carry out the operational test of the electronics racks ground cooling system FAULT warning (Ref. 21-55-00, P. Block 501).
(l)If applicable, carry out the operational test of the AC essential

busbar power supply (Ref. 24-25-00, P. Block 501).
(m)If applicable, carry out the operational test of the center and inner tank pumps automatic control (Ref. 28-21-00, P. Block 501).

(2)For current transformer (22XU) :
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Carry out the operational test of the static inverter (Ref. 24-24-00, P. Block 501).
(c)Carry out the operational test of the AC indicating system (Ref. 24-27-00, P. Block 501).
(d)Carry out the operational test of the DC normal generation (Ref. 24-32-00, P. Block 501).
(e)Carry out the operational test of the galley shedding system (Ref. 24-56-00, P. Block 501).
(f)Carry out operational tests of the Green auxiliary power indicating circuit and electric pump operation (Ref. 29-21-00, P. Block 501).
(g)Carry out operational tests of the windshield panel anti icing and defogging system (Ref. 30-42-00, P. Block 501).
(h)If applicable, carry out the operational test of the electronics racks air distribution (Ref. 21-21-00, P. Block 501).
(j)If applicable, carry out the operational test of the center and inner tank pumps automatic control (Ref. 28-21-00, P. Block 501).

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.
(3)Remove warning notice prohibiting use of external power receptacle from door 121EL.

SYS1 (2) TRANSFER CONTACTOR 11XU (12XU) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
B.	Torque Wrench
Referenced Procedures	
- 24-23-00, P. Block 301	Auxiliary AC generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1)Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : This is to avoid 115 Volt on contactors which are upstream EXT PWR line contactor.

(2)Open access door 121BL

(3)In flight compartment, on overhead panel 424VU,release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4)In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting operation of APU.

(5)In avionics compartment, remove GEN1, GEN2 doors from AC power center 101VU.

B. Removal

NOTE : Removal procedure is identical for transfer contactors 11XU and 12XU.

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1)Disconnect connector (5).

(2)Remove nuts (3) and remove power connections.

(3)Remove the four screws (1) and washers (2).

(4)Remove and retain contactor (4).

C. Installation

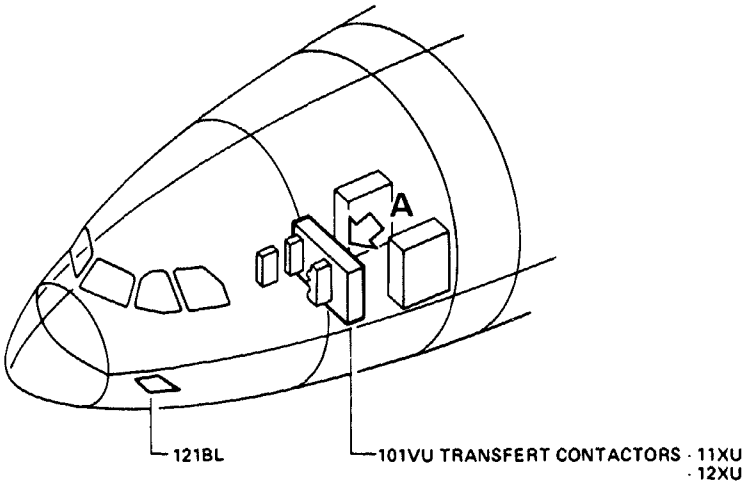
NOTE : Installation procedure is identical for transfer contactors 11XU and 12XU.

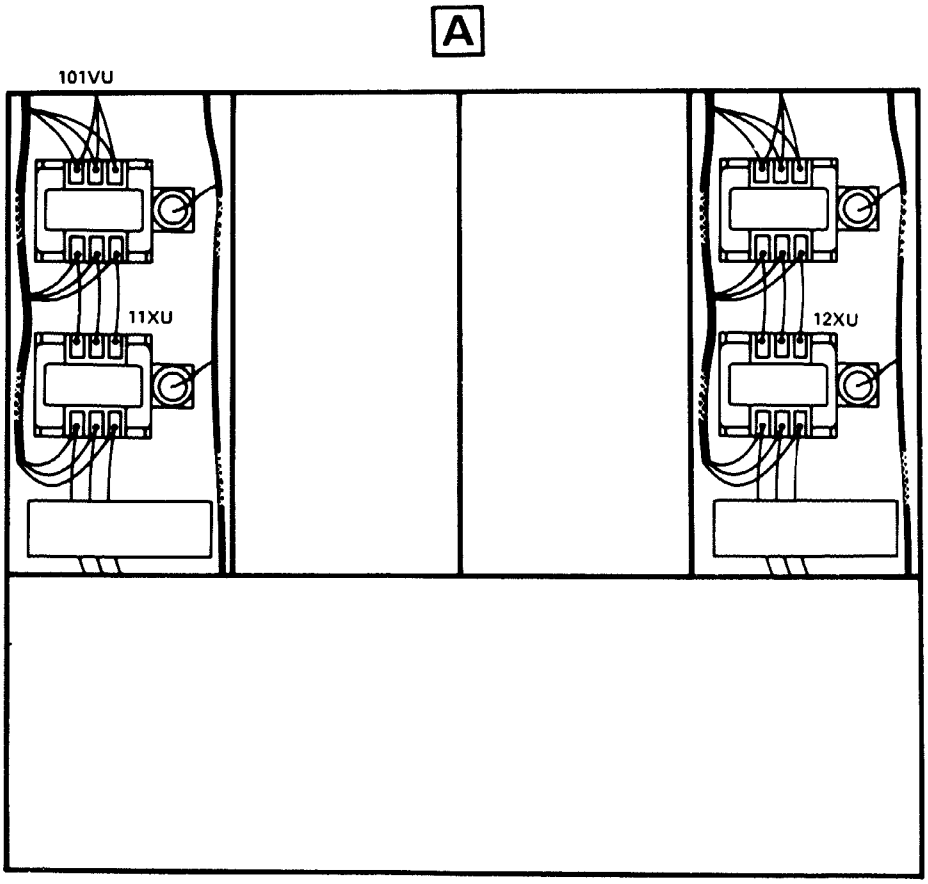
CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1)Position contactor (4) and secure with the four screws (1) and washers (2).

R (2)Secure power connections with nuts (3).

R (3)TORQUE nuts (3) to between 0.9 and 1 m.daN (79.65 and 88.49 lbf.in.).





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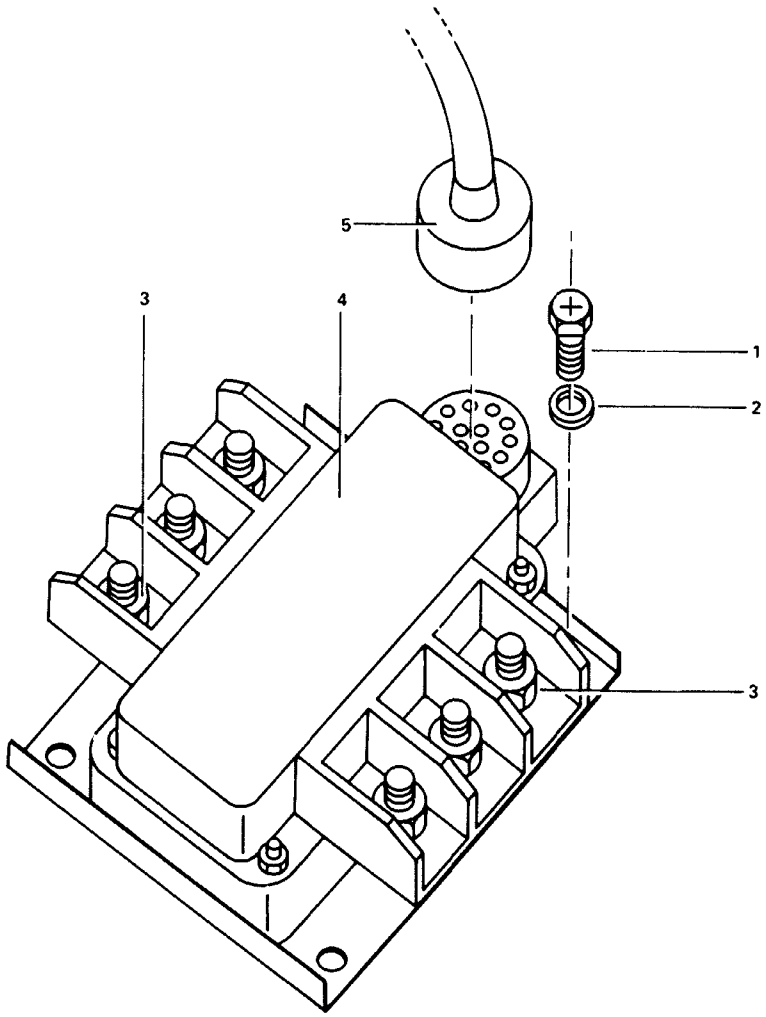
SYS1 (2) Transfer Contactor - Location
Figure 401



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SYS1 (2) Transfer Contactor
Figure 402

R (4)Connect connector (5).

D. Close-Up
(1)Install door(s) on AC power center 101VU.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panel 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

E. Test
Make certain of the correct supply of the aircraft electrical network by external power (Ref. 24-41-00, P. Block 301) or by APU generator (Ref. 24-23-00, P. Block 301).

AC AUXILIARY GENERATION

1. General

The AC auxiliary generation is provided by the APU generator which is able :
- in flight to replace either or both engine generators in case of failure
- on the ground to supply the aircraft network when (no ground power unit is available.

The auxiliary generator, directly driven at constant speed by the APU, is a conventional, 3-coaxial component brushless generator :
- PMG,
- rotating diode pilot exciter,
- finally, the generator itself.

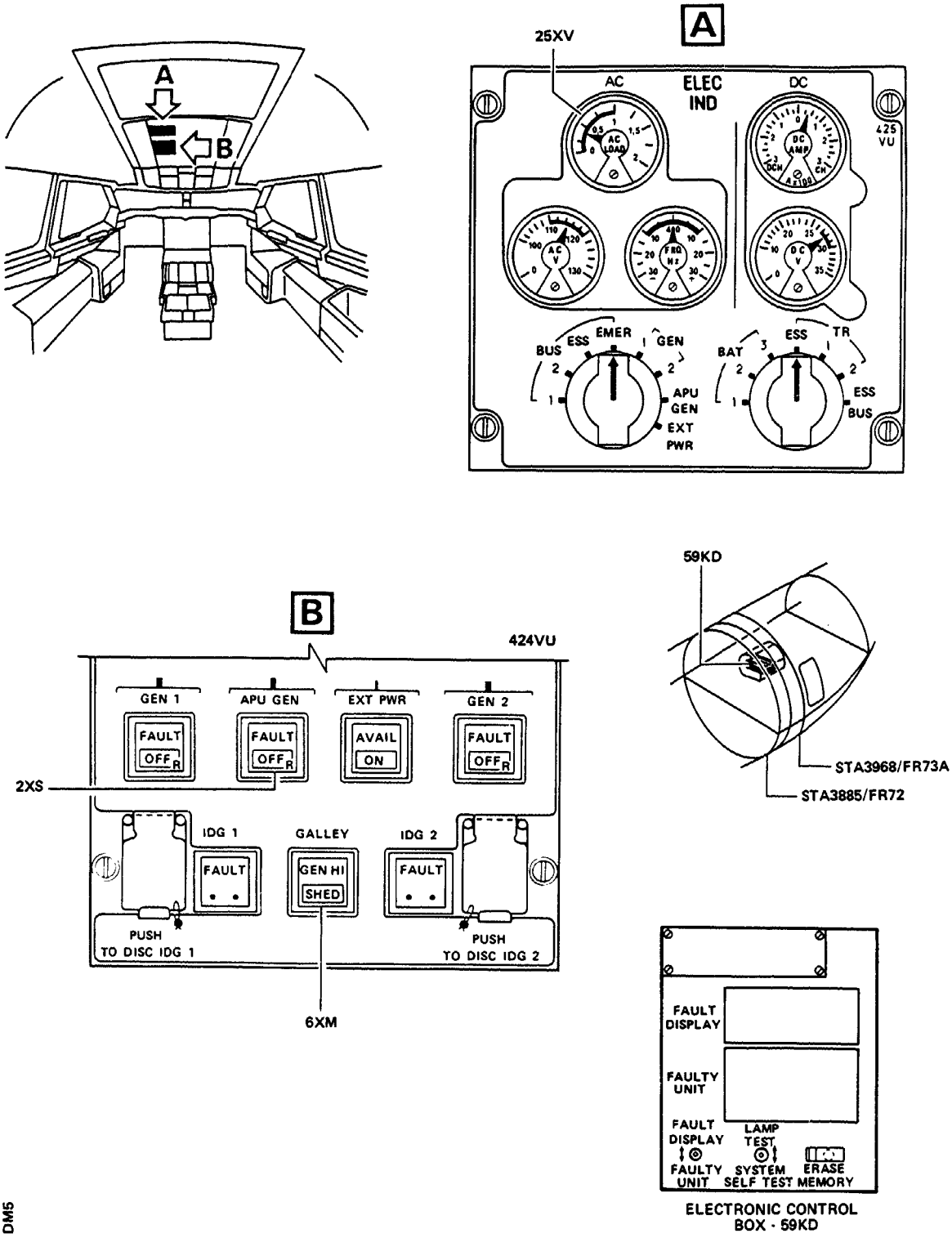
It is cooled by oil spraying and associated with a regulation and protection unit (GCU), the function of which is to :
- regulate the network voltage,
- control the generator while protecting the network and the generator
- control the different warnings and indicators.

Moreover, the GCU is fitted with a built-in test equipment (BITE) which enables maintenance operations of the system to be facilitated.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
59KD	CONTROL BOX-ELECTRONIC		252		49-61-11
3XG	CNTOR-AC EXT PWR	101VU	121	121BL	24-41-12
6BM	P/BSW-ELEC PWR/GALLEY	424VU	211		24-26-00
1XS	GCU-APU	101VU	121	121BL	24-23-12
2XS	P/BSW-ELEC PWR/APU GEN	424VU	211		24-23-00
3XS	CNTOR-APU GEN PWR LINE	101VU	121	121BL	24-23-13
8XS	GENERATOR-APU AC		311		
9XS	CURRENT TRANSFORMER-APU GEN	101VU	121	121BL	24-23-00
9XU	CNTOR-GEN1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR-TRANSFER, SYS1	101VU	121	121BL	24-22-18
12XU	CNTOR-TRANSFER, SYS2	101VU	121	121BL	24-22-18
7XG	GPCU	81VU	121	121BL	24-41-11
25XV	LOADMETER-AC	425VU	211		24-27-00



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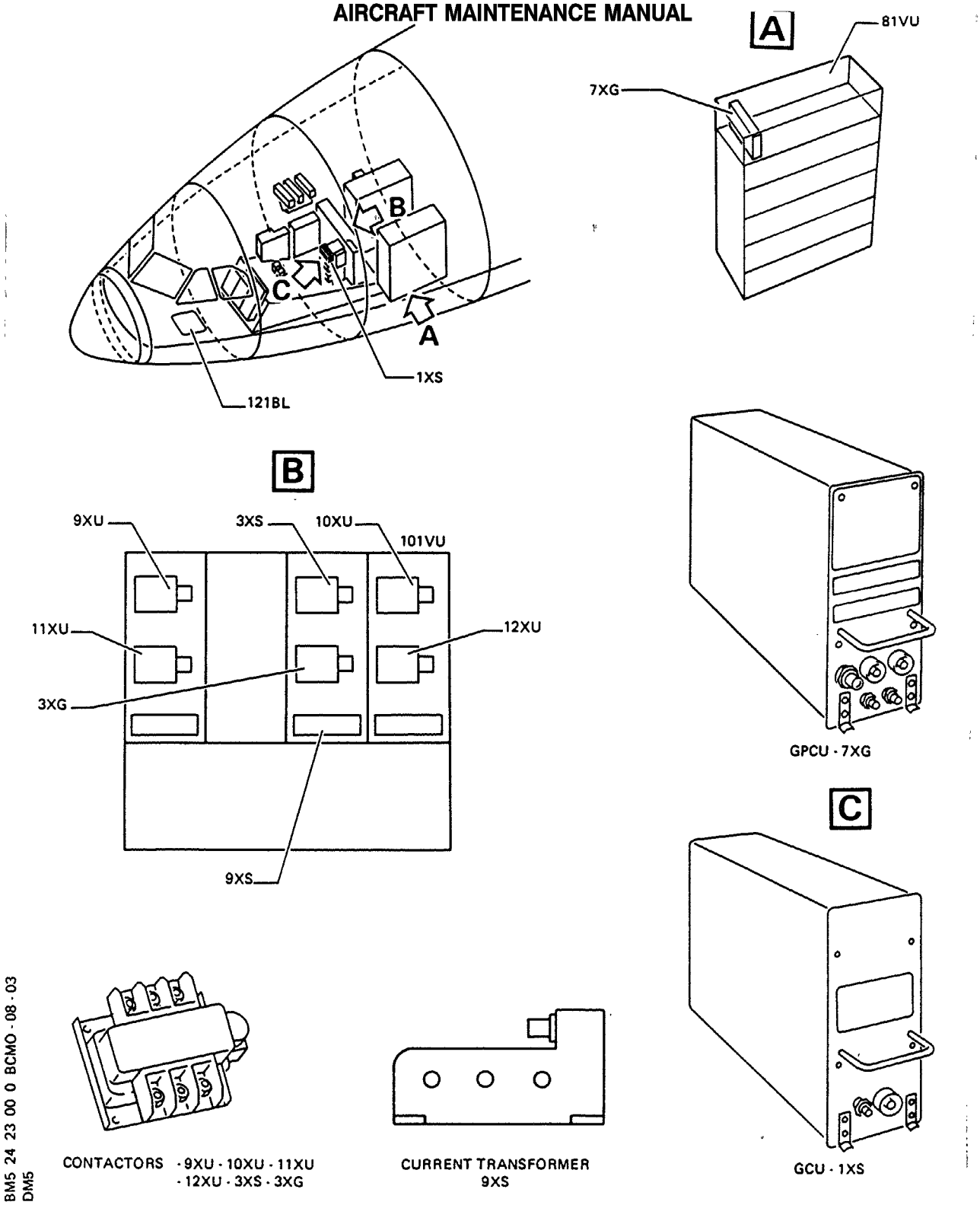
AC Auxiliary Generation - Component Location
Figure 001



AC Auxiliary Generation - Component Location
Figure 002

3. Control and Indicating Circuits

Controls and indications related to the APU generator are located on the flight compartment overhead panel and are transmitted, via the GCU.

A. Control and Indication in the Flight Compartment (Ref. Fig. 003, 004)

The operation of the APU generator is controlled by ELEC PWR/APU GEN pushbutton switch with two stable positions :

- OFF/R selected, the pushbutton switch is released out, and the white legend is on : the generator is shut down (de-energized and the line contactor is open)
- ON selected, the pushbutton switch is pressed in, the generator is energized, its rotational speed being high enough.
- If the electrical parameters are correct, the line contactor closes to supply the transfer circuit.

The effective supply of the aircraft network by means of the battery tie contactor(s) depends on the availability of the other generation sources.

NOTES : - On the ground, the generator line contactor will only close if the ground power unit does not already supply the transfer network : the ground power unit has a priority on the APU generator to supply the aircraft (Ref. 24-41-00, P. Block 1)
- For reference only, each aircraft network is supplied according to the following priority order :
  . by its generator
  . by the ground power unit
  . by the auxiliary generator
  . by the second generator
  (Ref. 24-22-00, P. Block 1)

FAULT amber legend on ELEC PWR/APU GEN pushbutton switch comes on and is repeated on the ECAM system to indicate a failure of the channel :
- failure detected and isolated by the GCU protection circuits,
- or with APU GEN driven, the line contactor open (except if the ground power unit supplies the aircraft electrical network).

FAULT legend goes off when OFF/R is selected.

NOTES : - Selection of OFF/R enables also the resetting of the GCU protection circuits after a fault detection (except if it is after the activation of the differential protection)
- with generator operation selected, FAULT warning is inhibited :
  . in case of APU underspeed (generator drive).

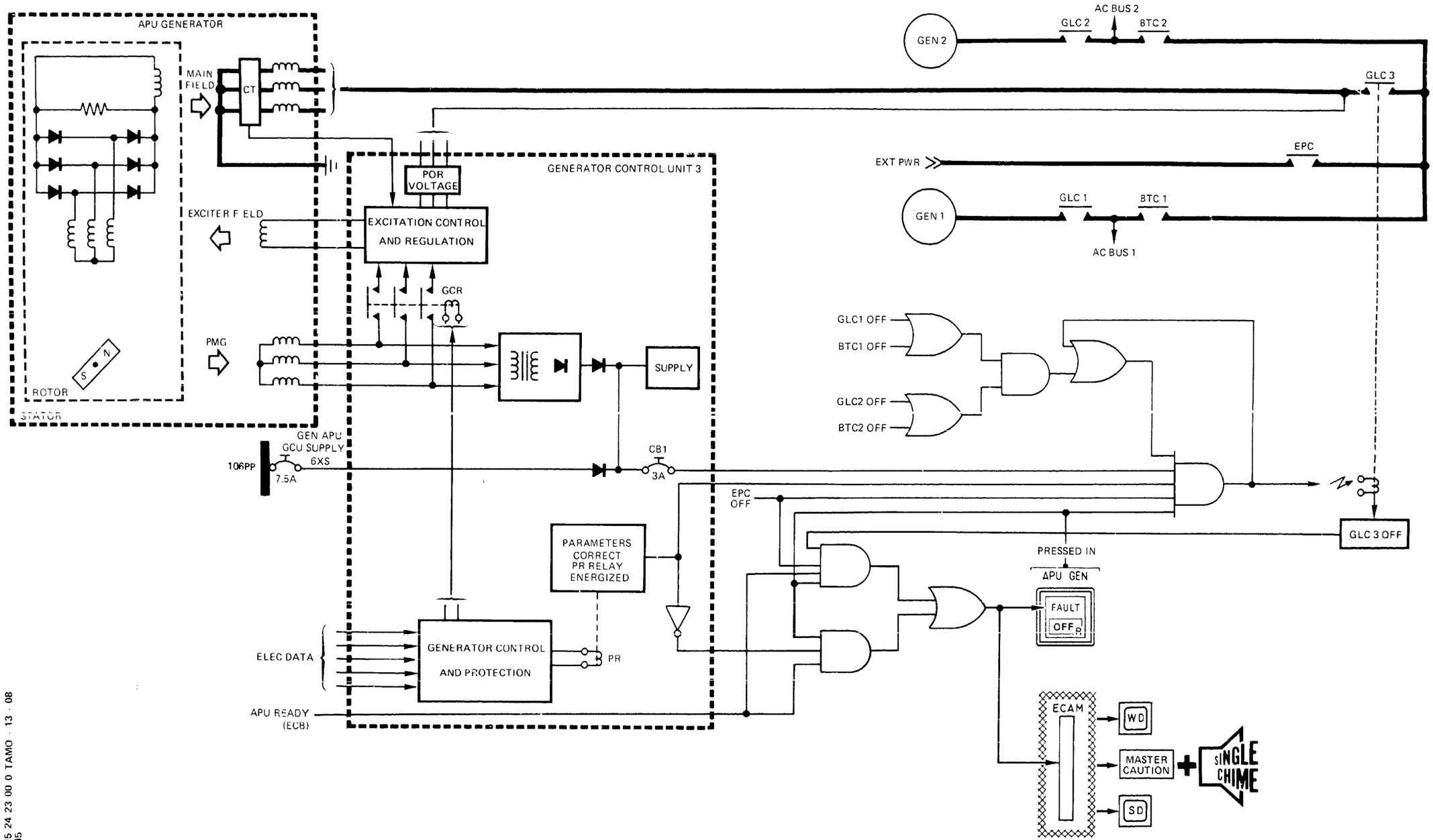
B. GCU General Operating Principle (Ref. Fig. 005)

The unit has four distinct functions :
- generator voltage regulation
- generator control and protection of the network and generator
- control of the various warnings and indications
- self-monitoring and test of the system.

When performed, these various functions are either digital or analog. The introduction of the digital system, built-up around the INTEL 8085 microprocessor, has permitted the integration of a test and failure diagnosis facility, thus considerably facilitating maintenance operations.

(1)Voltage regulation

The voltage is controlled by regulating the generator excitation so that



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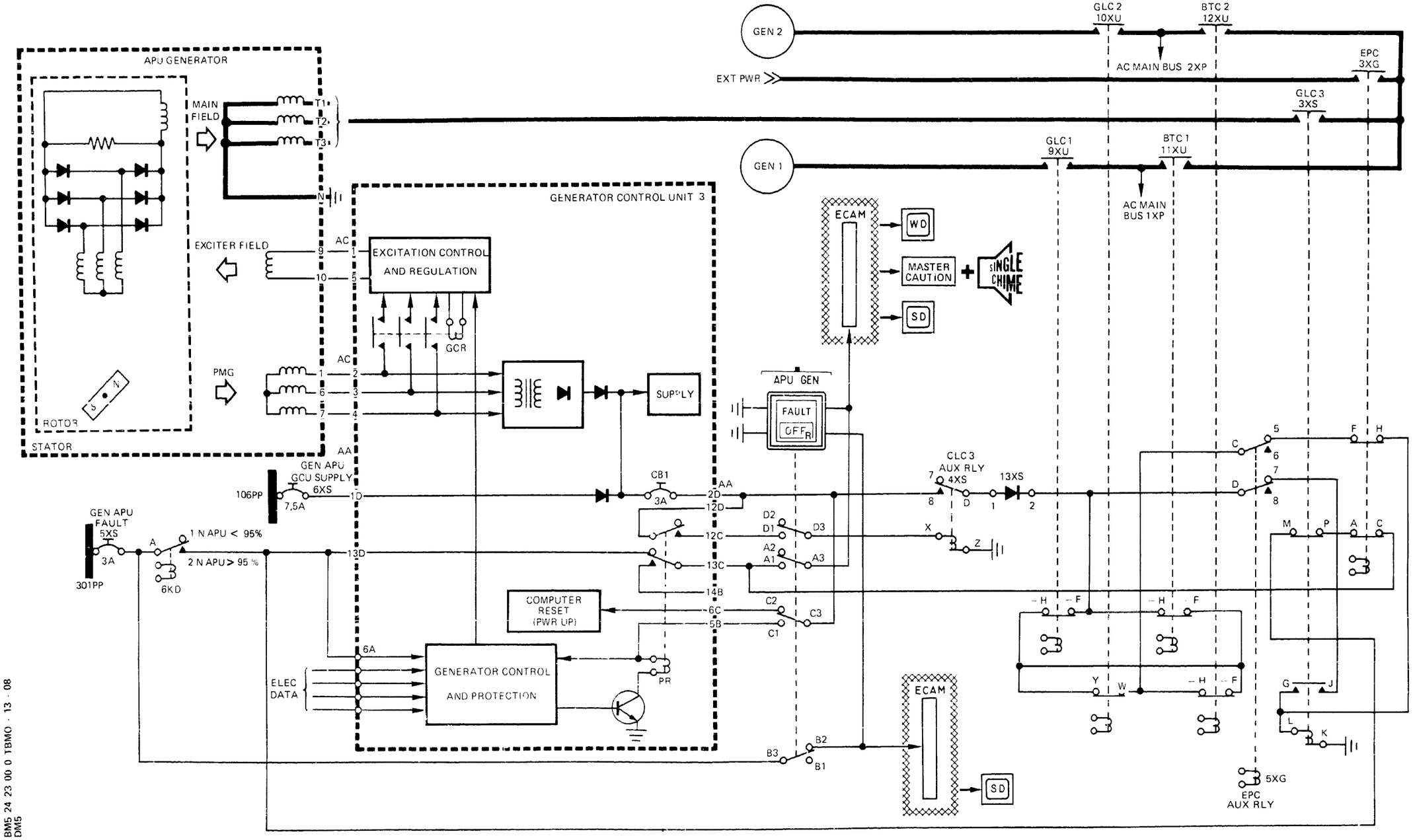
AC Auxiliary Generation - Control and Indicating
Figure 003



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AC Auxiliary Generation - Control and Indicating
Figure 004

the voltage is kept at the nominal point of regulation (POR). The POR is located in the electrical power center, at the end of the generator feeder, upstream of the line contactor.
The excitation supply is derived directly from the PMG ; that of the regulation circuits and in fact of the GCU assembly is too. Furthermore, this supply is duplicated from the aircraft network (back-up supply) (Ref. Fig. 004)

(2)Generator control and protection functions
These functions mainly consist in generator excitation and line contactor control :
- the excitation is controlled by means of the GCR,
- the line contactor by means of the PR relay.

Both these relays are controlled by signals received or generated by the GCU :
- over/undervoltage
- over/underfrequency
- differential protection
- rotating diode short circuit
- PMG short circuit
- Generator oil out overheat
- certain self-detected failures of the GCU (digital monitoring).

These control or fault signals cause generator shutdown and de-energization and, except further to the differential protection activation, the system can be reset by selection of OFF/R generator control.
More precisely, the PR is controlled by
- an APU drive underspeed which causes the generator shutdown
- and finally, an incorrect phase order which prevents the generator from being initially energized.

NOTES : - after a differential protection activation, the system reset
R is performed by :
R cycling the GEN CTL SWITCH. 2 times are only allowed.
R Or in sequence :
. at GCU level
. then by selecting OFF/R
(Ref. Para. 4.C. (c)).
- the GCU also commands the APU shutdown if the oil temperature at generator outlet becomes to high.

(3)Control of the various indications (warnings and annunciators)
The GCU controls the warning lights related to the generator :
- FAULT, when the protections are triggered (PR relay opening),
- GEN HI, when an overload is detected (Ref. 24-26-00, P. Block 1).

The GCU processes also the generator load information displayed on the monitoring panel and ECAM display unit (Ref. 24-27-00, P. Block 1 and 24-00-00, P. Block 1)

(4)System self-monitoring and test function
This function can be divided into three different parts :
- test and analysis due to generator tripping
- passive fault detection
- maintenance test.

(a)Test and analysis due to generator tripping
During a generator tripping (active failure) the GCU :

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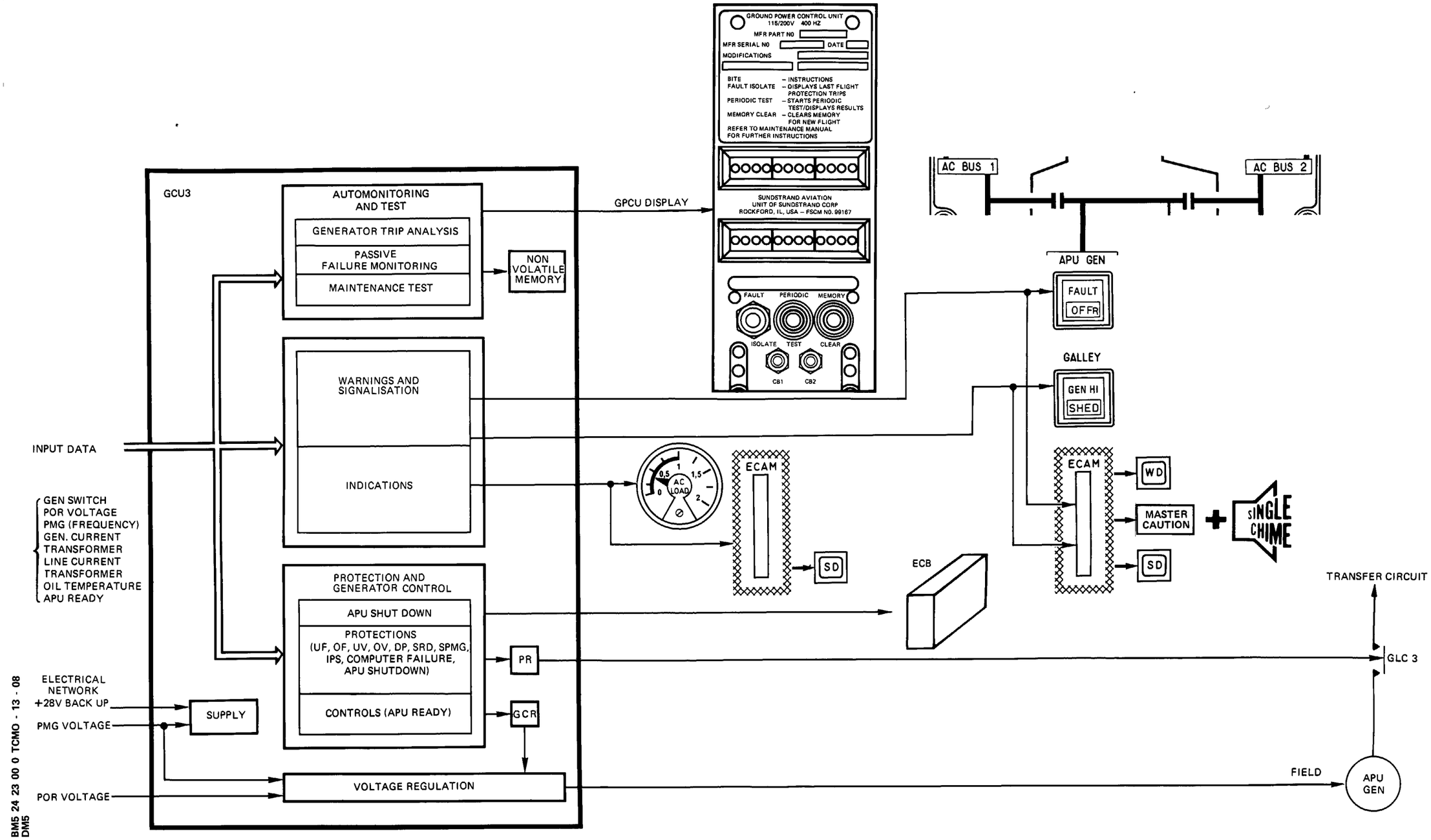


AC Auxiliary Generation - Generator Control Unit
Block Diagram
Figure 005

- identifies the protection which has caused the tripping (over-frequency, differential protection, etc...)
- analyzes the conditions in which the tripping has occurred,
- then, after analysis, determine the origin of the fault (control unit, wiring or peripherals).

All these data are stored in a non volatile memory.
On the ground, they can be displayed on an alphanumeric display window located on the front face of the GPCU by means of a serial data link between the two control units (Ref. 24-41).

(b) Passive failure detection

Certain passive failures, that is those which do not cause generator tripping, can affect the system operation.
The GCU permanently monitors the majority of the circuits concerned.
When detecting a fault, the GCU determines the origin and stores the data in the non volatile memory.
As previously, these data can be displayed on the ground, on the GPCU display.

(c) Maintenance test

It can only be performed on the ground, with the generator shut down.
It completes to a certain extent, the monitorings already described.
The test is performed by exciting (stimuli) the circuits concerned and analyzing the response.
It is controlled :

- either automatically and periodically every seven flights
- or manually, by means of the GPCU and the serial data link.

The result of the test is stored in a non volatile memory and can also be displayed on the ground, on the GPCU alphanumeric display window.

4. AC Auxiliary Generator (Ref. Fig. 006)

The AC auxiliary generator, driven at constant speed, is a conventional, 3-coaxial component brushless generator :

- PMG
- rotating diode pilot exciter
- finally, the generator itself.

It is cooled by oil spraying.

A. PMG

It consists in :

- a twelve pole permanent magnet inductor, installed on the rotor,
- and a three-phase armature, star connected and with no ground reference, installed on the stator.

As soon as the generator runs, the electrical power which is necessary to

- the generator energization,
- the supply of the GCU and the various external relays and contactors (line contactors, etc...)

is supplied. The system is thus electrically independent.

It should be noted that the PMG has been designed so as to withstand a possible short circuit in steady state operation.

B. Pilot Exciter

It consists in :

- a ten-pole inductor installed on the stator,
- a three-phase armature installed on the rotor and star connected,
- a rectifier assembly made up of six (rotating) diodes and of a filter.

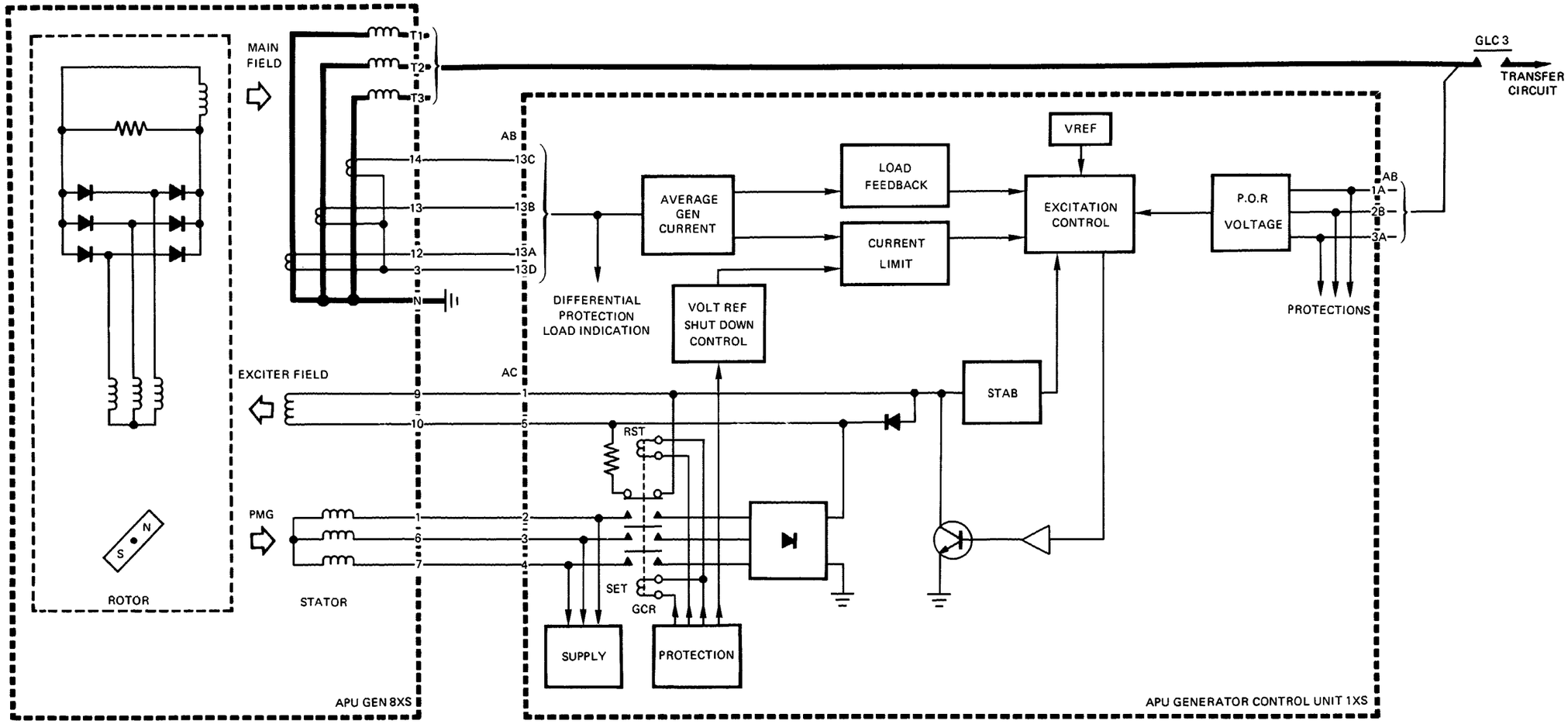
Its energization is directly controlled by the GCU and enables the supply of the generator inductor with direct current via the armature and rectifier.

C. Generator

It comprises :

- a four-pole inductor installed on the rotor and supplied by the exciter,
- the armature, installed on the stator, three-phase star connected and a neutral side connected to the aircraft structure.

It should be noted that the three coils are connected through current transformers to the generator neutral side. The current data for the three phases are provided to the GCU.



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AC Auxiliary Generation - Generator and Voltage Regulation
Figure 006

D. General Characteristics
- PMG
  . nominal load : TBD
  . no load voltage : 88 V between phases
  . short circuit current : 13A
  . frequency 1200 Hz at 12,000 rpm
- generator
  . nominal load : 90 HVA
  . overload : 112.5 KVA, 5mn
    150 KVA, 5 sec.
  . voltage at for : 115 V, three-phases, with neutral ground connected regulated by the GCU)
  . frequency : 400 Hz at 12,000 rpm,
  . current transformers, rate : $\frac{1}{1000}$

5. Generator Control Unit (GCU)

The GCU has four different functions
- voltage regulation
- generator control and protection of the network and generator
- control of the various indications
- self-monitoring and test of the system.

These functions, and generally speaking, the voltage regulation, is performed in the analogic form, and the other functions in digital form.

A. GCU supply

The GCU is supplied (Ref. Fig. 004)
- directly from the PMG (which is also used for generator excitation supply).
  The GCU generates 28VDC from this voltage and for its own needs (± 15 V, ± 5 V -28 V supply)
- and with 28VDC from the aircraft normal network.
  This dual supply constitutes the internal 28 V supply (back-up supply).

B. Voltage Regulation (Ref. Fig. 006)

The voltage regulation is performed by regulating the generator excitation current.
The regulation is achieved by analog circuits.
The excitation supply is directly provided by the PMG via the GCR and after rectification, is controlled by a chopper amplifier (pulse width modulation), protected by a freewheeling diode.
The regulation is performed using the following data :
- voltage sensed at the point of regulation (POR),
- generator load provided by the three current transformers included in the generator,

by comparison to a reference and so that the average voltage of the three phases can be maintained within the permissible limits.
It should be noted that :
- during an operation in unbalanced rating, the voltage level of the higher phase is limited. This limit has a priority on the regulation of the three phase mean voltage

- a stabilization circuit enables the dynamic response of the regulation to be improved
- a current limiter circuit enables limitation of the current supplied by the generator, and thus of the mechanical power supplied by the drive part, by limitating the excitation current.
  The voltage/current relation ship is as shown on Detail A
  (Ref. Fig. 007)
- in case of fault detection by the protection circuits, the generator excitation is cut off :
  . electronically by simulating a noticeable short circuit via the current limitation (voltage regulation shut down : VR S/D), Ref. Para. C (2) (b),
  . and by cutting off its supply by the GCR.
- with (generator selected on line, the excitation command signal (VR S/D) is also used to command :
  . the initial generator excitation at APU start ; the voltage/frequency relationship is as shown in Detail B (Ref. Fig. 007)
  . its de-energization at APU shutdown.

In this particular use (ON function selected), the GCR remains closed.

C. Generator Controls and Protection Functions (Ref. Fig. 008, 009)

The generator control and the network and generator protection functions are mainly provided by means of the GCR and PR relay.
The GCR controls the excitation of the generator, whereas the PR relay controls its line contactor together with FAULT warning light.
These two relays are themselves controlled by a microcomputer which processes the various electrical parameters necessary to the protection functions.

NOTE : The microcomputer processes also the indication control and controls the system test and self-monitoring.

(1)Protection

(a)Over/underfrequency (OF, UF)

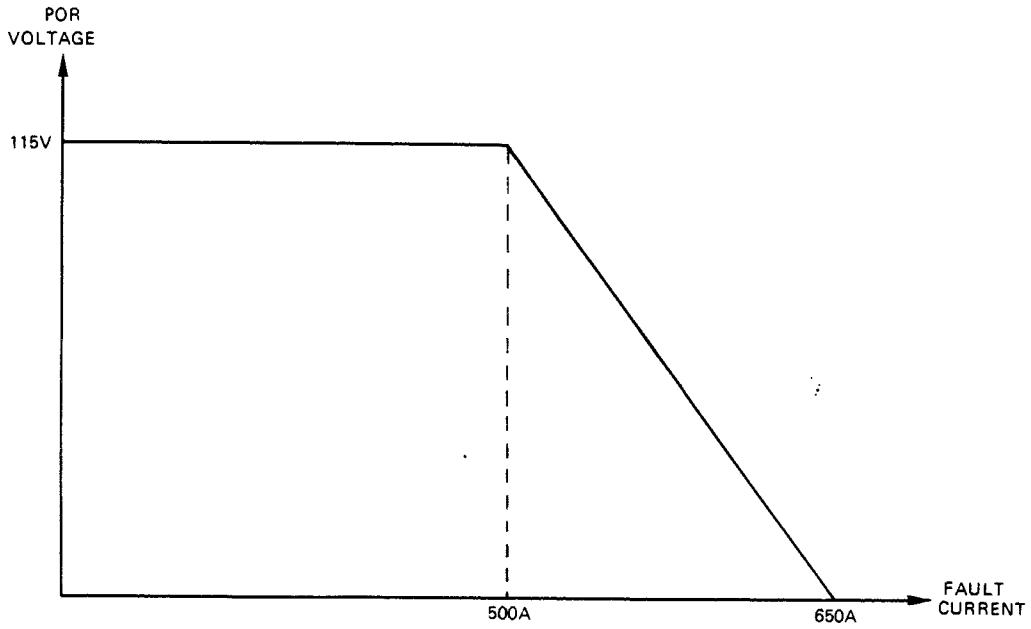
The control unit monitors permanently the frequency of the PMG phase A.
The over/underfrequencies are triggered when they become higher/lower than a certain threshold.

NOTES : - The underfrequency is inhibited in case of APU underspeed (Ref. Para. (2) (a)).
- The over/underfrequencies are also operational with the generator not excited (PMG frequency measurement).

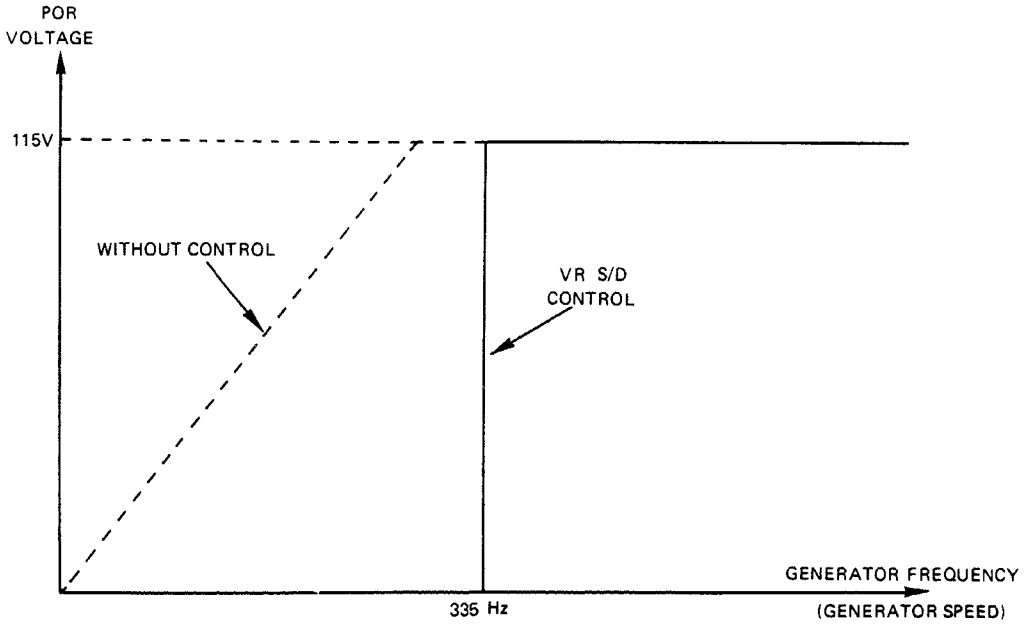
(b)Over/undervoltage (OV, UV)

The control unit monitors permanently the voltage of the three phases at the POR.
The undervoltage is triggered when the voltage of the lower phase becomes lower than a certain threshold.
In the same way, the overvoltage is triggered when the voltage of the higher phase becomes higher than a certain threshold.

NOTE : The undervoltage is inhibited in case of :
- APU underspeed
- APU underfrequency.



A VOLTAGE/FAULT CURRENT LIMITATION



B VOLTAGE/FREQUENCY CONTROL DURING APU START

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AC Auxiliary Generation - Characteristics
Figure 007

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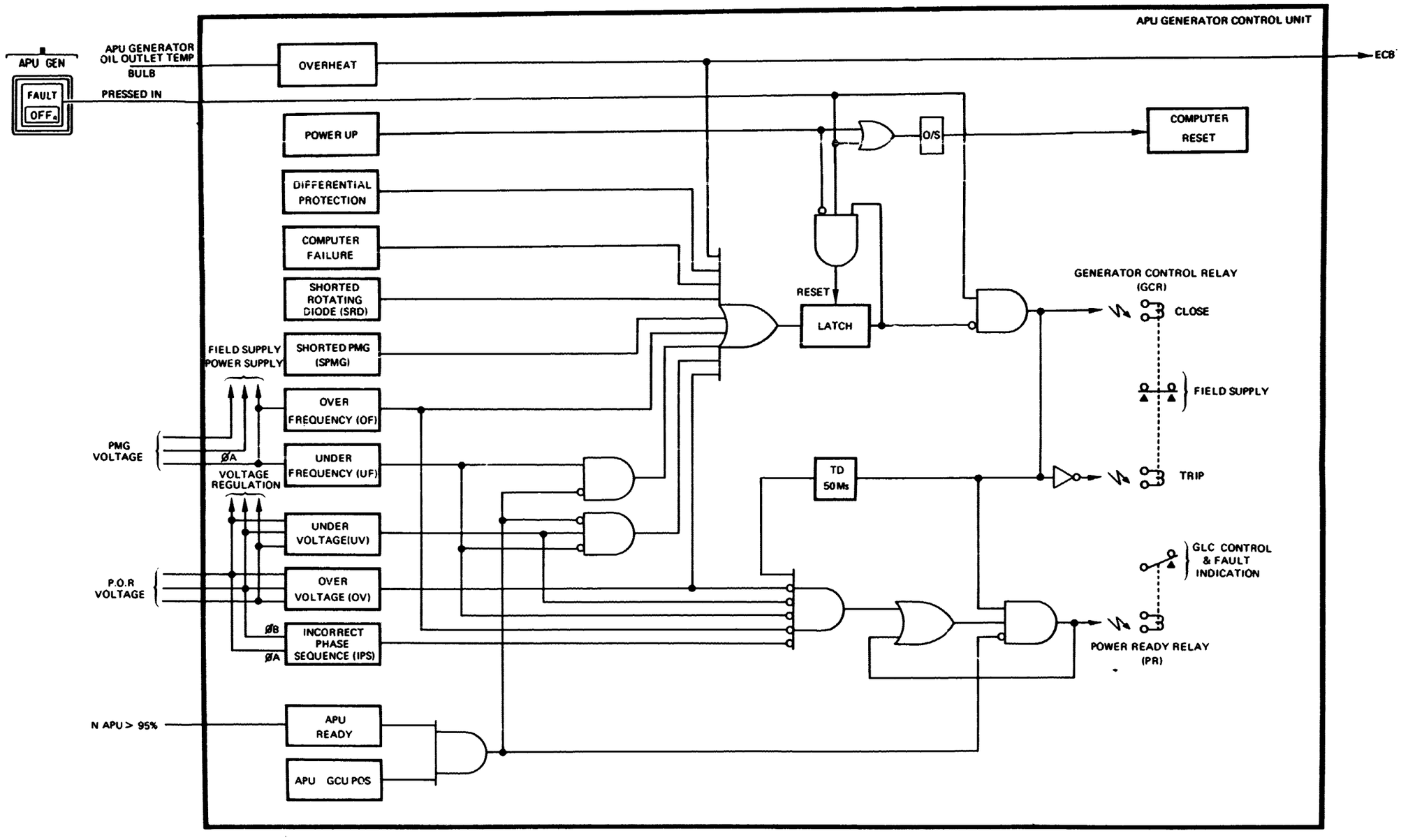

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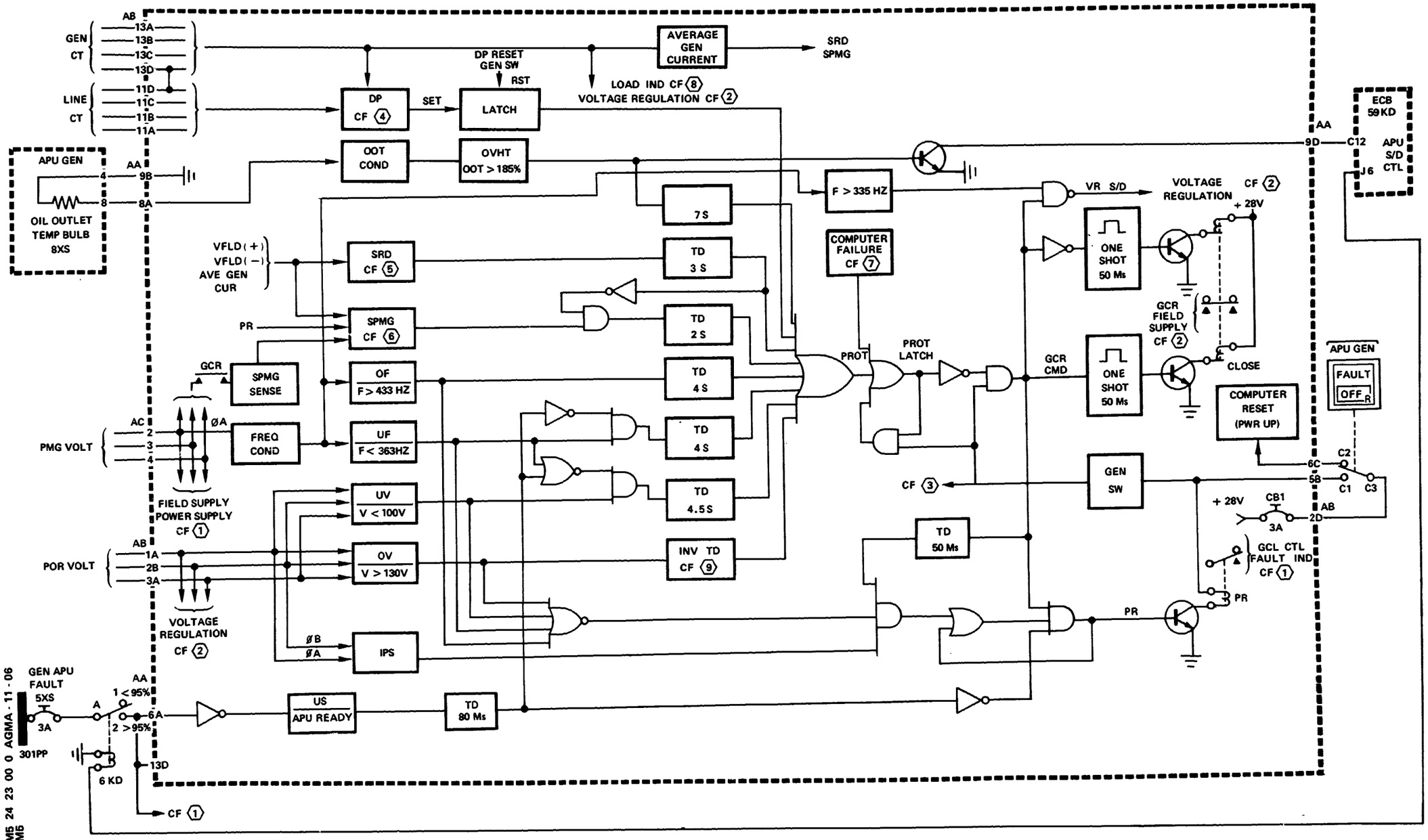
AC Auxiliary Generation - Generator Control Unit Control
Figure 008



AC Auxiliary Generation - Generator Control Unit Control
Sheet 1/2
Figure 009

(1) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUSILIARY GENERATION -- CONTROL AND INDICATING

(2) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- GENERATOR AND VOLTAGE REGULATION

(3) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- GENERATOR CONTROL UNIT CONTROL

(4) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- DIFFERENTIAL PROTECTION

(5) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- SHORTED ROTATING DIODE PROTECTION

(6) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- SHORTED PMG PROTECTION

(7) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- COMPUTER MONITORING

(8) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION -- GENERATOR LOAD INDICATION AND OVERLOAD WARNING CONTROL

(9) - REF. 24-23-00 P. BLOCK 1 : FIG. INVERSE TIME DELAY CHARACTERISTIC FOR OVERVOLTAGE PROTECTION

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AC Auxiliary Generation - Generation Control Unit Control
Sheet 2/2
Figure 009

(c)Differential protection (DP)

1 It prevents the electrical wiring between the two detection current transformers from being damaged (Ref. Fig. 010, 011).
The protected area is comprised of the generator coils and the feeders.
Reminder : The protection of the two network distribution assemblies is provided by the two GCUs of the normal generation (Protection of area 2, Ref. 24-22-00, P. Block 1)

2 When the generator supplies all or part of the network, the two generator and line current transformers sense the same current.
In case of fault on the wiring (leakage to the ground or short circuit between phases) it is no longer the case : the noticeable difference between the two current information triggers the protection which causes immediately the generator tripping and de-energization.
NOTE : The differential protection monitors the three phases individually and takes into account the current unbalance on the phase where it is the higher.

3 Any protection triggering is memorized by the control unit even if its supply is cut off.
The system can be reset :

R by cycling the ELEC PWR/APU GEN PUSHBUTTON SWITCH 2 times are only
R allowed.
R Or in sequence :

- by pressing DP RESET pushbutton on the face of the control unit located in the avionics compartment (control unit supplied), (Ref. Fig. 012)
- then by selecting OFF/R on ELEC PWR/APU GEN pushbutton switch on the flight compartment overhead panel.

(d)Shorted rotating diode (SRD)

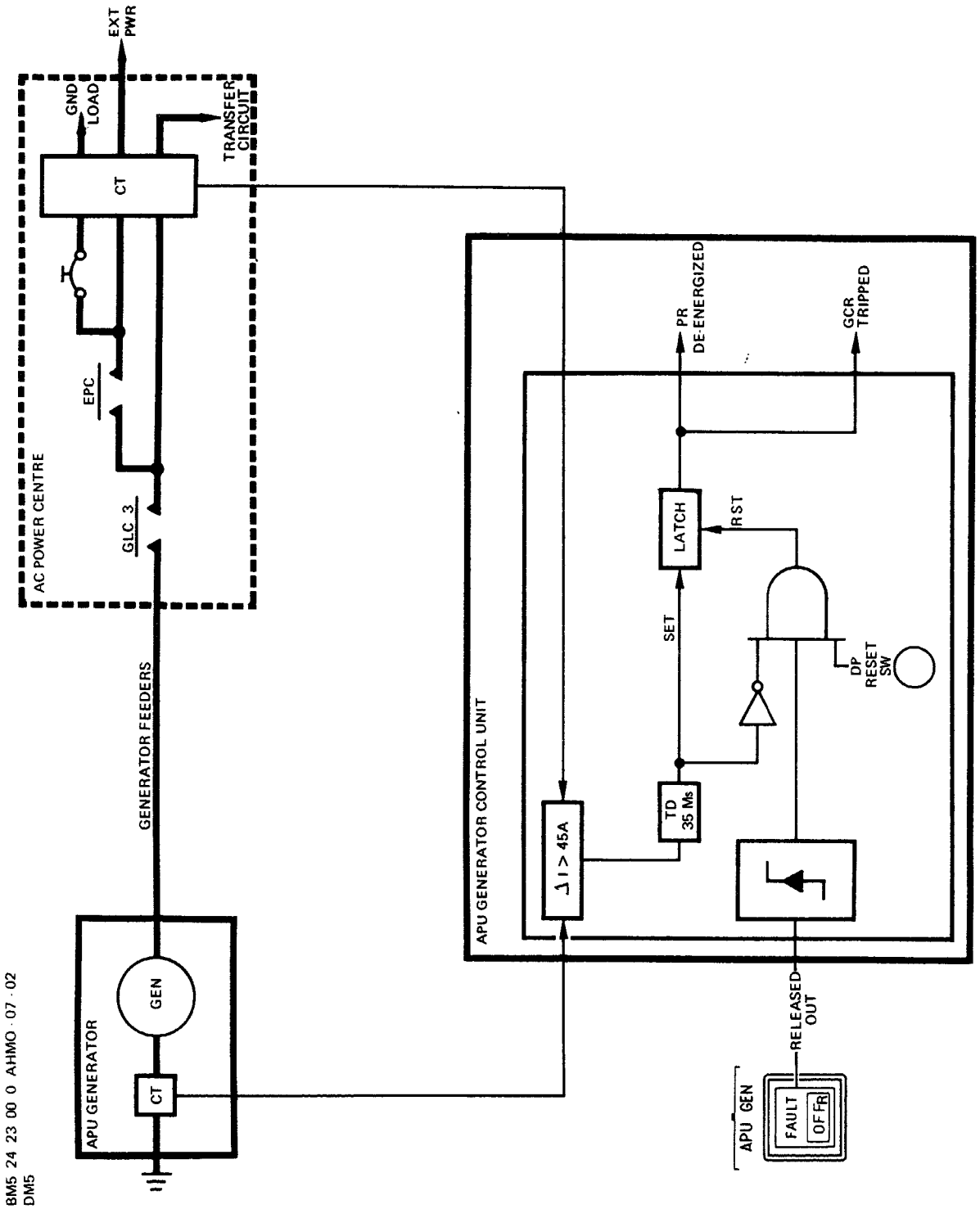
This detection is performed using the following data :
- voltage at inductor terminals
- generator load.

(Ref. Fig. 013)
The protection is triggered if for a given generator load, the voltage at inductor terminals becomes too high.

(e)Shorted PMG (SPMG)

This detection is performed using the following data :
- inductor data (hot point),
- generator load,
- PR relay control,
- short circuit provided by an analog detector monitoring the voltage of the three phases of the PMG (Ref. Fig. 014)

With the generator running with no load (PR open), a possible short circuit is detected by the analog circuit.
With the generator on line, the protection triggers if for a given load, the voltage of the inductor is too low.
It should be noted that in both cases, this protection is inhibited in case of shorted diode detection.



AC Auxiliary Generation - Differential Protection
Figure 010

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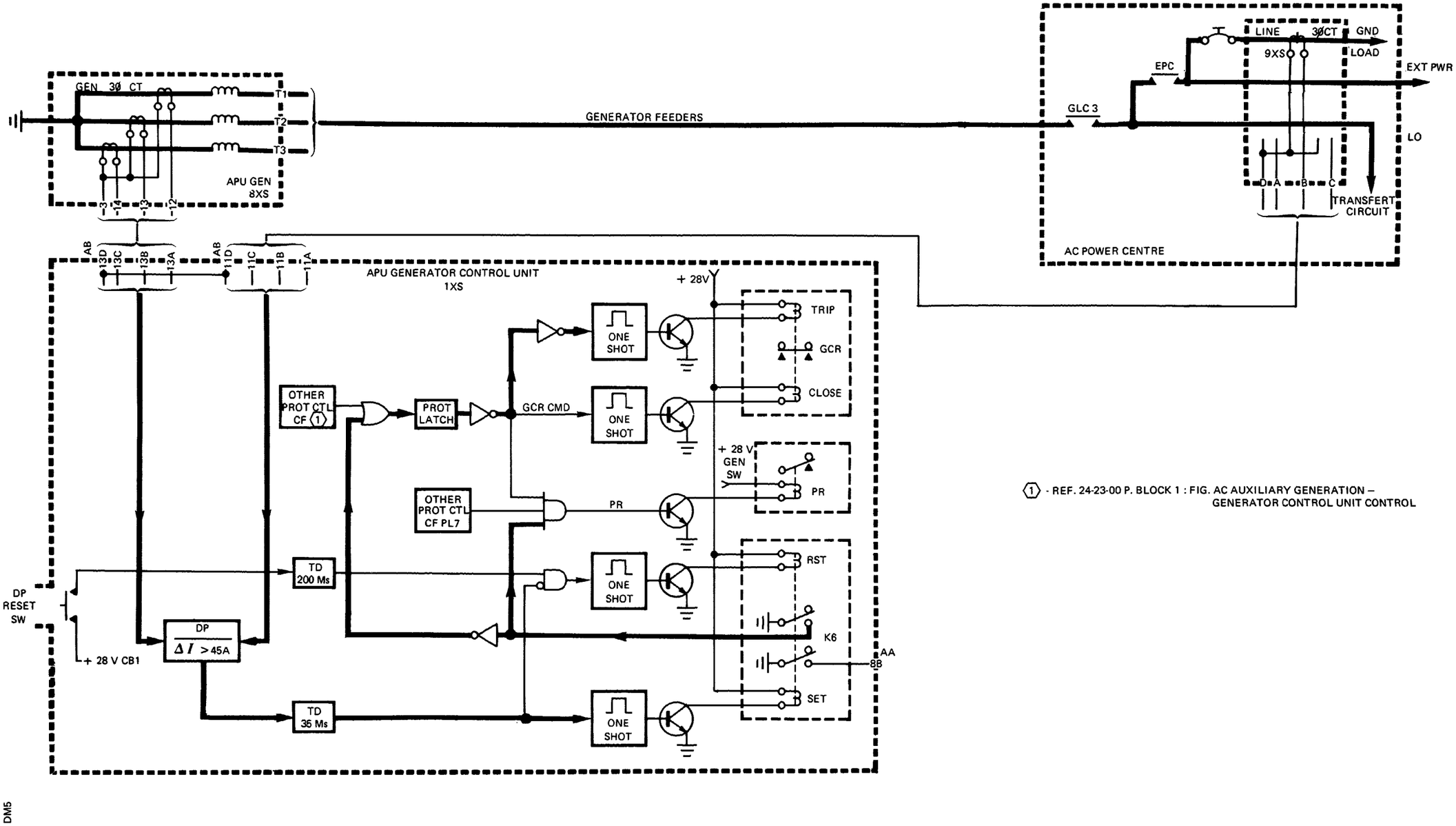
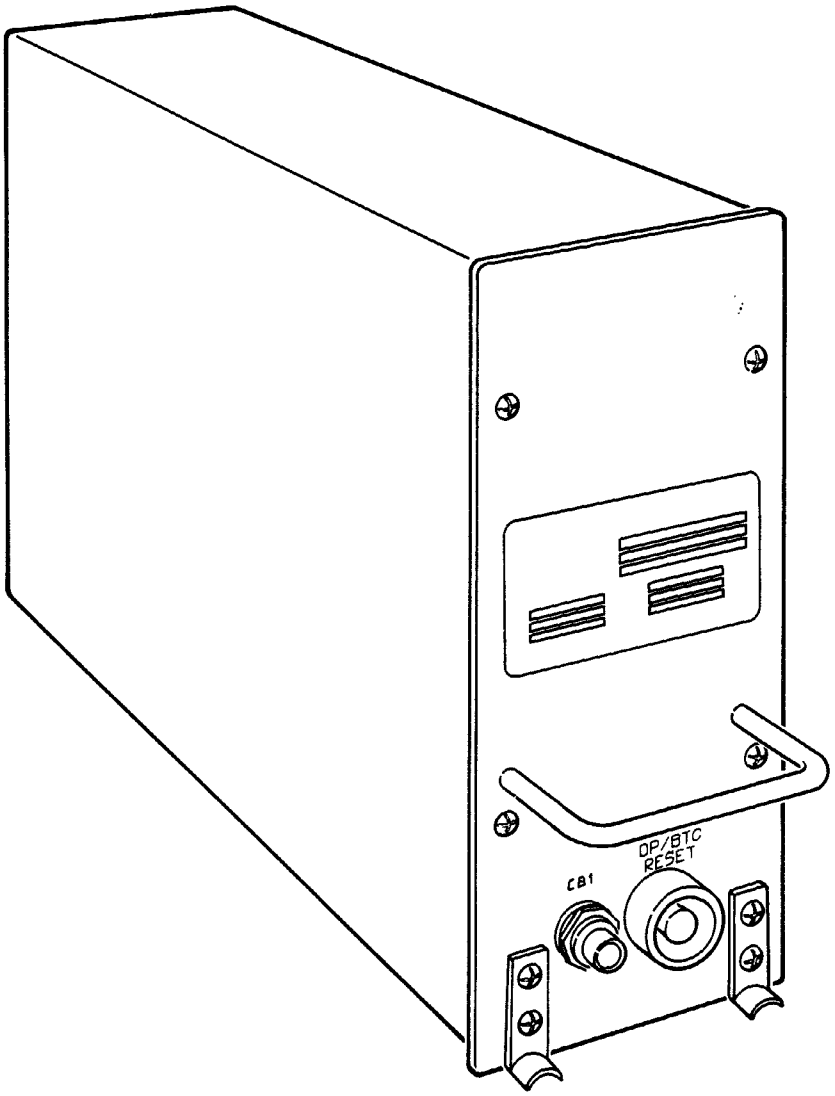


(1) - REF. 24-23-00 P. BLOCK 1 : FIG. AC AUXILIARY GENERATION – GENERATOR CONTROL UNIT CONTROL

AC Auxiliary Generation - Differential Protection
Figure 011



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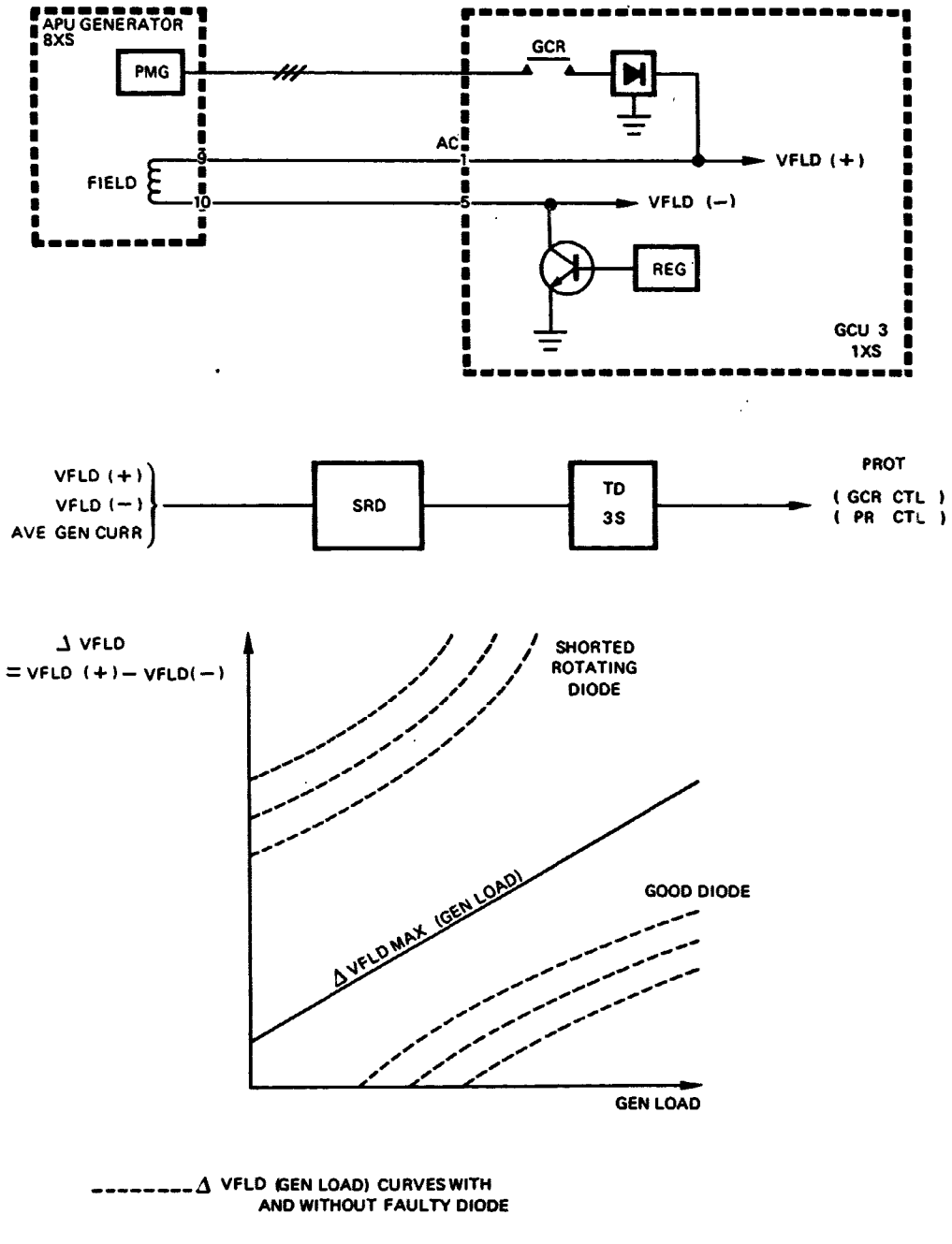
AC Auxiliary Generation - Generator Control Unit
Figure 012



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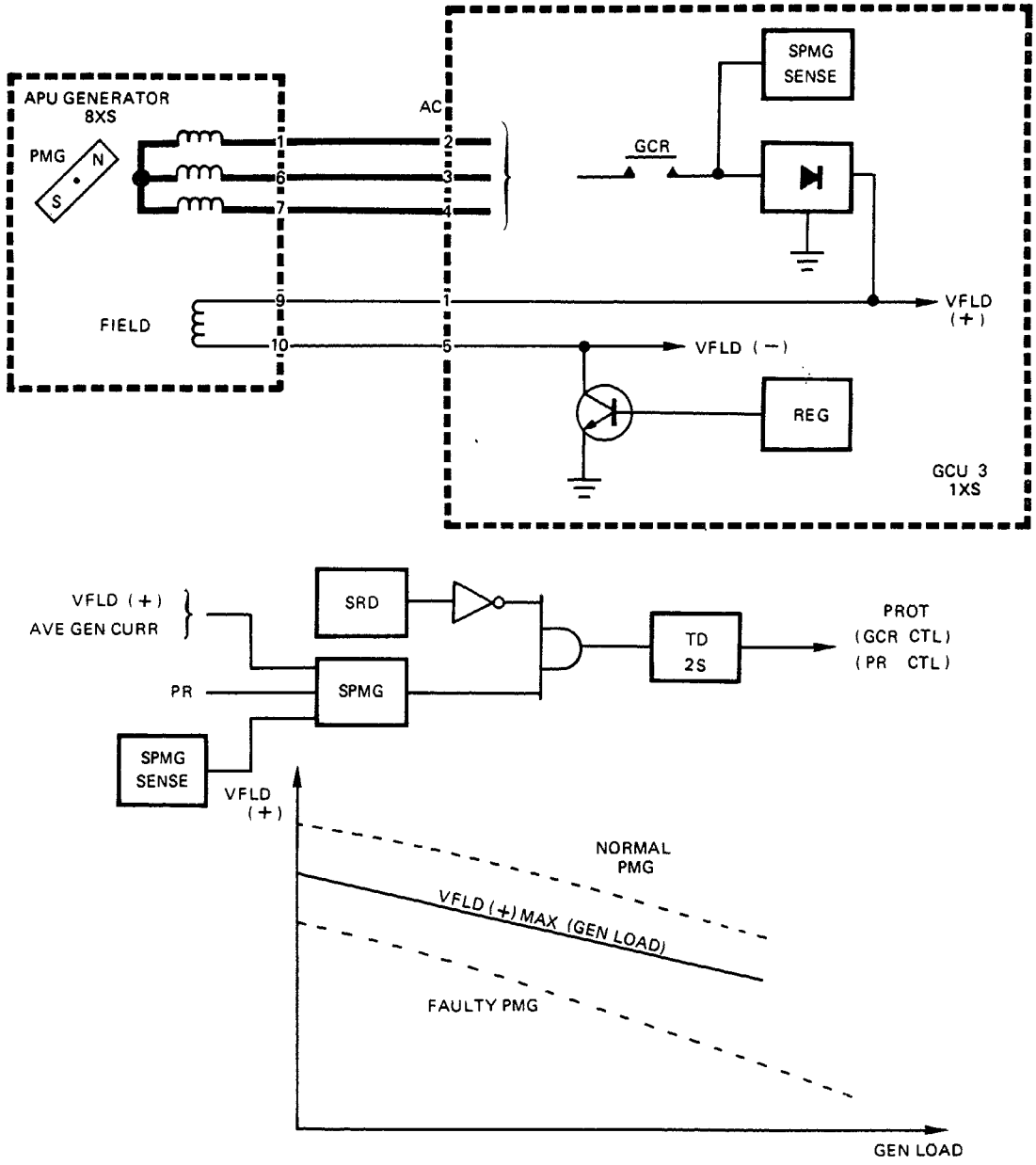
AC Auxiliary Generation - Shorted Rotating Diode Protection
Figure 013



------- VFLD (+) (GEN LOAD) CURVES WITH NORMAL PMG AND WITH FAULTY PMG

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AC Auxiliary Generation - Shorted PMG Protection
Figure 014

(f)Incorrect phase order (IPS)

This detection is provided by voltage information from phases A and B at the point of regulation.

Once the generator excited, the control unit analyzes the phase order of the voltage it supplies. If the phase order is incorrect the generator is not brought on line (protection of the three-phase consumers).

(g)Control unit fault (Ref. Fig. 015)

The control unit processed all the assigned functions in a sequential and periodical mode and according to a predetermined program.

Once the system initialized all the operations are performed during a so-called "major" cycle, which comprises essentially :

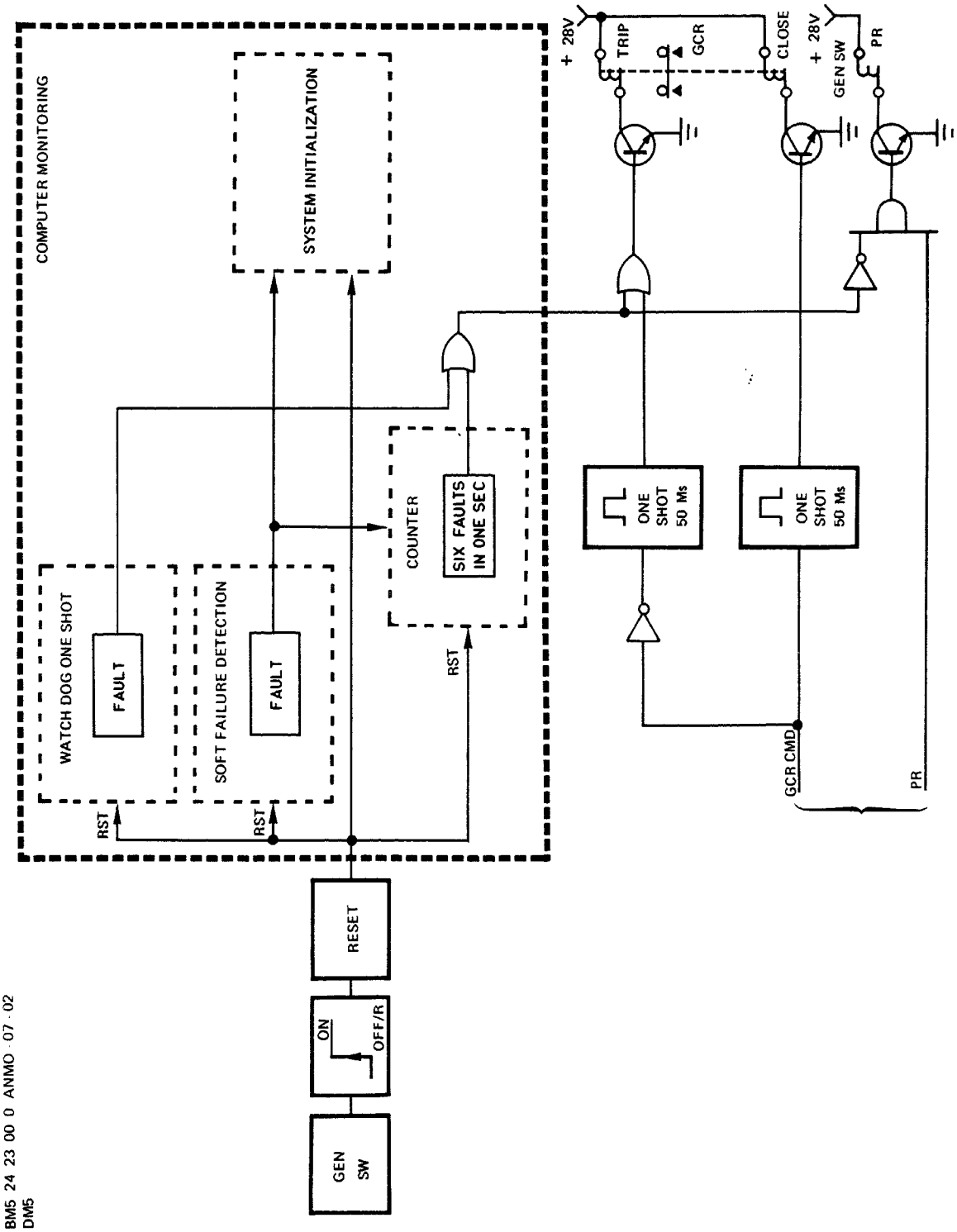
- the control, protection and indicating functions,
- the system test and self-monitoring functions.

The correct development of the program is monitored by two distinct means :

- a monitoring enabling the detection of a discrepancy in the periodical development of the program (watch dog one shot) and which, in case of fault causes the generator tripping together with its de-energization
- a monitoring enabling the detection of soft failures, and which, in case of fault causes a total re-initialization of the system. Nevertheless, the detection of six faults of the type within one second is considered as a hard failure and also causes the generator tripping and de-energization.

NOTES : - The protection function and the generator control (GCR, PR) function are both processed by the control unit.
The monitoring of the program periodical development enables a fail-safe triggering of the system to be provided in case of fault detection by a direct analog command at the two relay.

- Further to a protection triggering the system can be reset by selecting ELEC PWR/APU GEN pushbutton switch on the flight compartment panel from OFF/R to ON.
- A test of the majority of the control unit fault detection circuits is automatically performed :
. aircraft on the ground,
. during an APU shut down (underspeed, Ref. Para. (2) (a)),
and lasts 20 sec when the test develops normally.



AC Auxiliary Generation - Computer Monitoring
Figure 015

(2)Various controls

(a)APU underspeed

The APU speed information is transmitted to the GCU under the form of a
R discrete signal by the APU control box (ECB).
The 0V/28 V signal corresponds respectively to a thrust rating lower/higher than 95%.
An APU underspeed (N < 95%) commands generator tripping (PR).
NOTE : In the case of APU shutdown, the underfrequency occurring after the underspeed causes the generator de-energization (VR S/D, Ref. Para. (b) and (Ref. Fig. 016)

(b)Control of the generator excitation at regulation

In case of fault detection by the protection circuits, the generator excitation is cut off :
- when cutting off supply to the inductor by the GCR,
- electronically, at regulation level (Ref. Para. B) by simulating a noticeable short circuits via the current limitation (VR S/D).

With generator operation selected, the excitation order signal (VR S/D) is used to command :
- the generator energization at APU start-up
- its de-energization at APU shutdown, according to the generator rotational speed (PMG frequency).

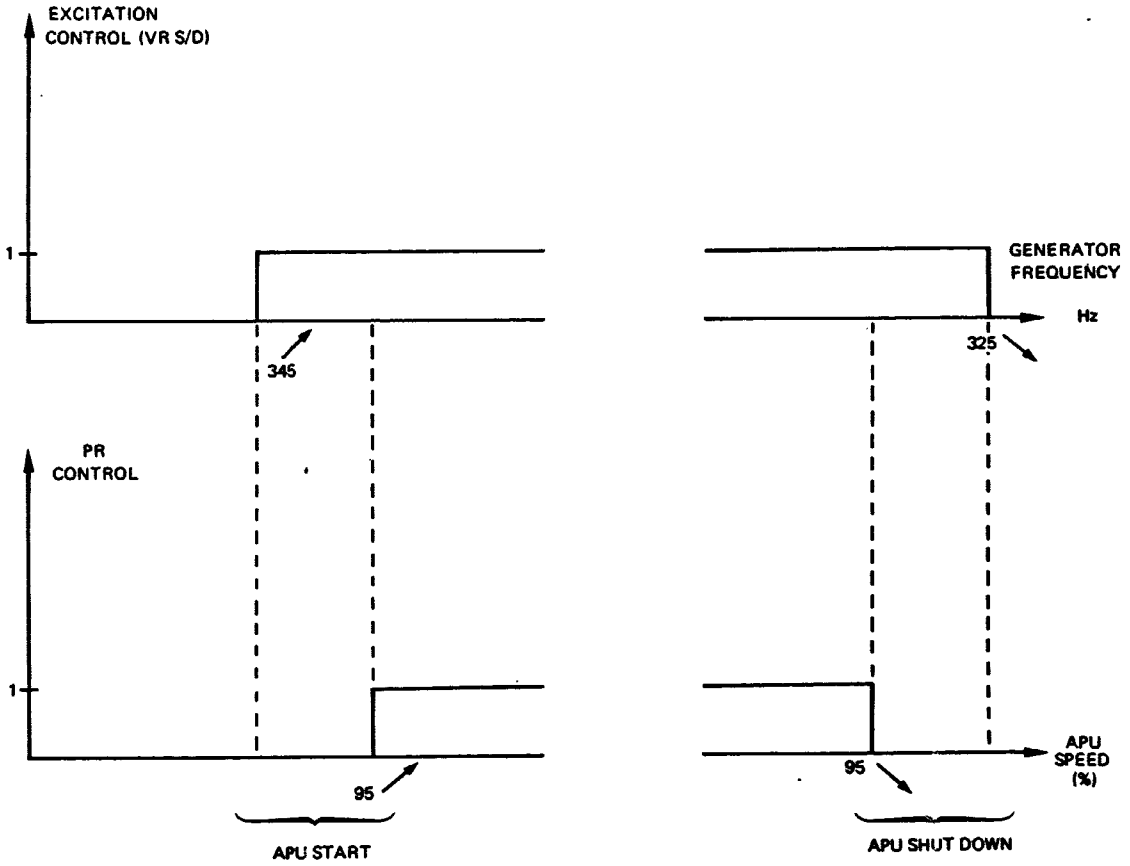
(c)APU shutdown order

The control unit receives permanently temperature information from generator oil outlet.
In case of overheat detection, it commands immediately the APU shutdown via its control box (ECB).

(3)Control and protection operation in normal use

(a)Initial energization of the generator

- with generator operation preselected (GCR closed) at APU start, the generator is excited as soon as its rotational speed is high enough (VR S/D).
  If the voltage, frequency and phase order are correct, the PR commands the generator energization as soon as the APU reaches the required speed (APU RDY).
- with the APU running, the selection of the generator to ON enables :
  . its energization (closure of the GCR)
  . then, if voltages, frequency and phase order are correct energization (closure of the PR) 50ms later.



WITH GENERATOR CONTROL SWITCH TO ON AND GCR CLOSED

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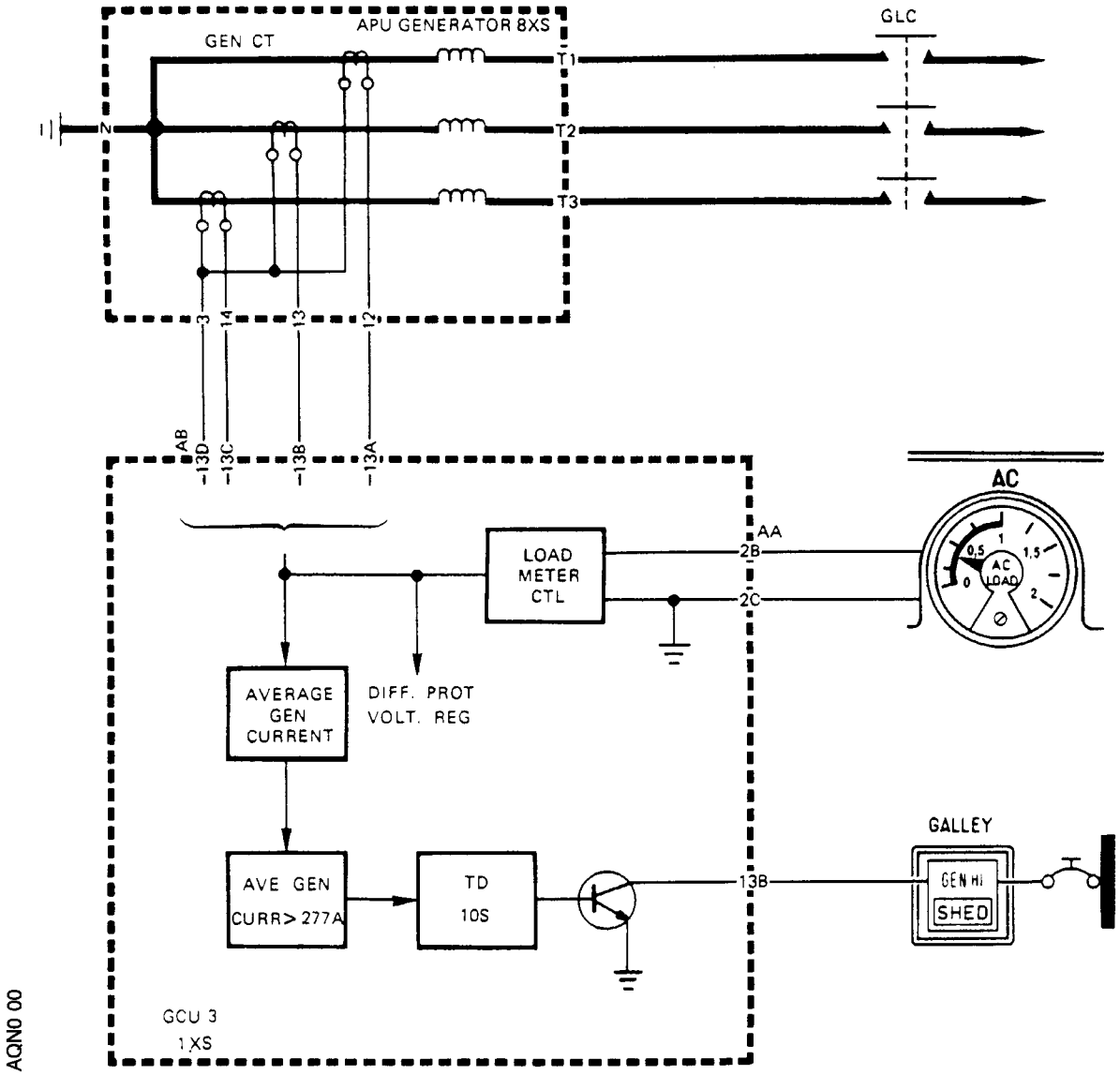
AC Auxiliary Generation - Generator Control During APU Start and Shut Down
Figure 016

(b)Generator supplying the network
In case of one protection being triggered :
UF/OF
UV/OV
DP
SRD
SPMG
control unit fault,
generator oil-out overheat
and after the associated timing the control unit commands :
. the generator tripping (**PR** opening)
. and its de-energization (opening of the **GCR, VR S/D**).
The system can be reset by selecting **ELEC PWR/APU GEN** pushbutton switch from **OFF/R** to **ON** (except for differential protection, Ref. Para. 1 (c)).

D. Generation of Warnings and Indications
(1)Warnings
(a)Generator **FAULT** warning (Ref. Fig. 004)
With engine running, **FAULT** legend comes on and the **ECAM** system is triggered when the **PR** opens further to the activation of one of the protections or if the line contactor is open (except if the ground power unit supplies the aircraft network).
(b)**GEN HI** warning (Ref. Fig. 017)
For reference only (Ref. 24-26-00, P. Block 1) the control unit controls the illumination of **GEN HI** legend, with triggering of the **ECAM** system, in case of high load detection. **GEN HI** warning light goes off when the load has dropped below the detection threshold.
(2)Generator load indication
The control unit processes the generator load indication from the current information provided by the generator current transformers (Ref. Fig. 017) (Ref. 24-27-00, P. Block 1)
These values are also displayed on the **ECAM** display unit (Ref. 24-00-00, P. Block 1).

E. System Self-Monitoring and Test Functions
Self monitoring and test of the auxiliary generation system is performed in the same way as for the main generation.
In consequence, refer to 24-22, para. 2.C (5).

F. General Characteristics
References : Sundstrand **P/N** 740120C
(1)Voltage regulation
Voltage at the **POR** (balanced loads)
- 115 V ± 1 V for a load from 0 to 90 KVA
- 115 V ± 1.5 V for a load from 90 to 112.5 KVA
- 115 V ± 2 V for a load from 112.5 to 150 KVA



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AC Auxiliary Generation - Generator Load Indication
Figure 017

(2)Protections

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATION
- OF	431/435 Hz	4 ± 1 sec	GCR and PR relay opening + VR S/D
R - UF	361/365 Hz	4 ± 1 sec	GCR and PR relay opening + VR S/D
- OV	130 ± 1.5 V	Inv. TD Refer to figure	GCR and PR relay opening + VR S/D
- UV	96/104 V	4.5 ± 0.5 sec.	GCR and PR relay opening + VR S/D
- DP	40/50 A	37.5 ± 2.5 ms	GCR and PR relay opening + VR S/D
- SRD	Refer to figure	3 ± 0.5 sec.	GCR and PR relay opening + VR S/D
- SPMG	Refer to figure	3 ± 0.5 sec.	GCR and PR relay opening + VR S/D
- IPS	Refer to figure	-	Prevents PR relay closure
- Computer failure	Refer to figure	-	GCR and PR opening

Table 001 and (Ref. Fig. 018, 013)
(Ref. Fig. 014, 009, 015)

(3)Various controls

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATION
- US	+28 V OFF (N APU < 95%	80 ms	PR relay opening
- Low input speed	325/345 Hz	-	De-energization by VR S/D
- OVHT	OOT > 185 ± 5°C		APU shutdown (via the ECB)
		7 sec.	GCR and PR relay opening + VR S/D

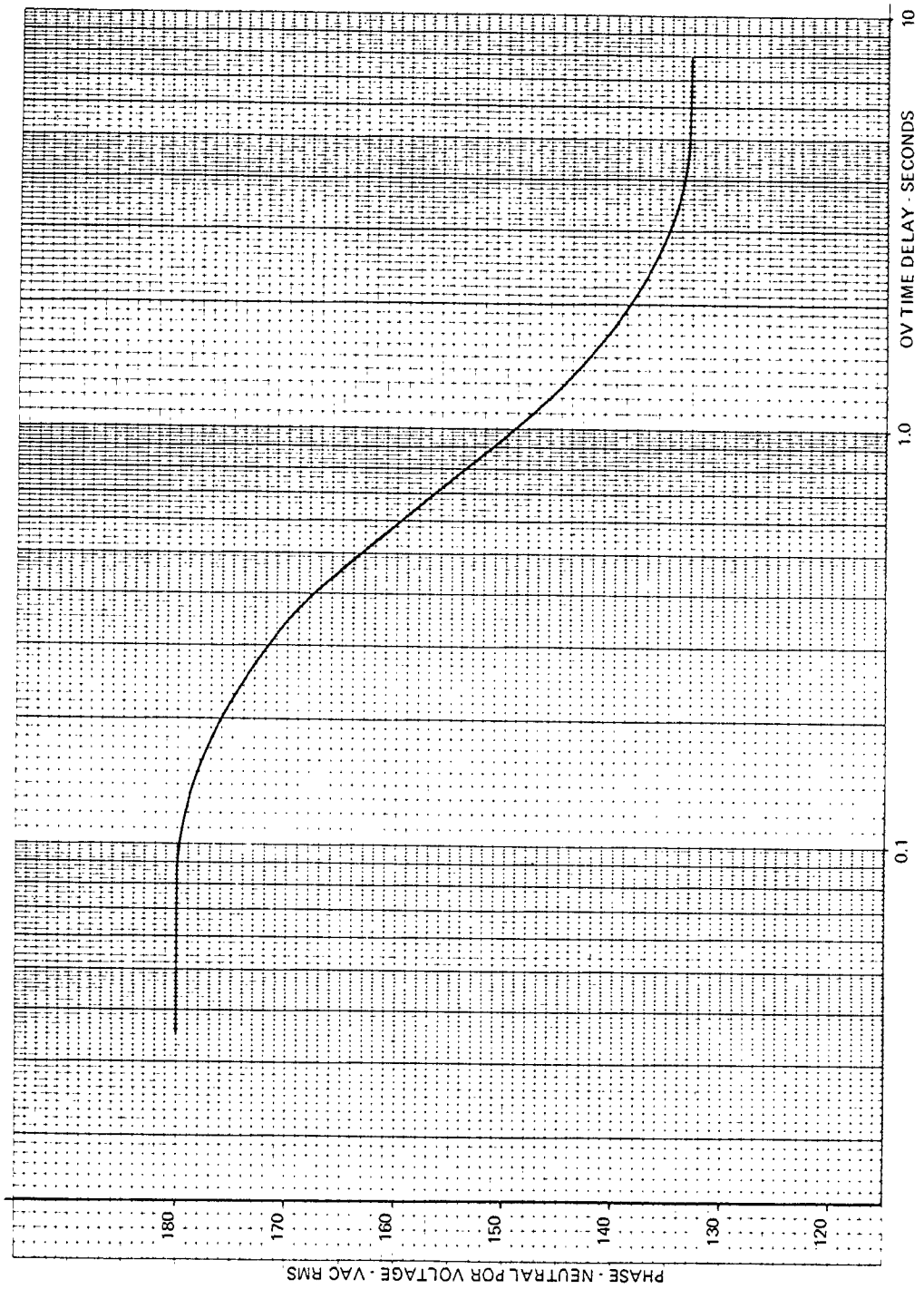
Table 002

(4)Warnings

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATION
- FAULT	Refer to figure	-	For Ref. only : connected to the PR
- OC	Generator load > 277 ± 13 A	13 ± 3 sec.	GEN HI warning light control when activated (Ref. 24-26)

Table 003 and (Ref. Fig. 004)

(5)Generator load indications



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Inverse Time Delay Characteristics For Overvoltage Protection
Figure 018

(Ref. Fig. 017)

1. Reason for the Job
Aircraft electrical network supply by APU generator

2. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 49-00-00, P. Block 501	Airborne Auxiliary Power

3. Procedure

A. Job Set-Up
(1)On panel 424VU
- Make certain that all pushbutton switches are released except ESS & EMER/BUS

(2)On panel 424VU
(a)Press BAT pushbutton switches
- BAT pushbutton switch flowbars come on
- DC NORM BUS OFF and DC ESS ON BAT warning lights come on
- AC BUS 1 OFF, AC BUS 2 OFF and AC ESS BUS OFF warning lights come on
- OFF legends of GEN 1, GEN 2 and APU GEN come on.
- AC EMER ON INV warning light comes on indicating that static inverter supplies AC emergency busbar.

(3)Start up APU (Ref. 49-00-00, P. Block 501)

B. Aircraft Electrical Network Supply
(1)When the APU is at normal rating :
On panel 424VU
- press APU GEN pushbutton switch
- OFF legend goes off.

(2)Correst operation of the protection circuit and of the aircraft network supply is indicated by :
On panel 424VU
- extinguishing of DC NORM BUS OFF and DC ESS ON BAT warning lights
- extinguishing of AC BUS 1 OFF, AC BUS 2 OFF and AC ESS BUS OFF warning lights
- OFF legends of GEN 1 and GEN 2 pushbutton switches are on.
- extinguishing of AC EMER ON INV (static inverter shutdown) warning light

C. Aircraft Electrical Network Supply Cutoff
(1)On panel 424VU
- press and release APU GEN pushbutton switch
  - OFF legend comes on.

(2)Power supply cutoff is indicated by
On panel 424VU
- illumination of DC NORM BUS OFF and DC ESS ON BAT warning lights
- illumination of AC BUS 1 OFF, AC BUS 2 OFF and AC ESS BUS OFF warning

lights
- illumination of **OFF** legend on **GEN 1** and **GEN 2** pushbutton switches.
- illumination of **AC EMER ON INV** warning light (static inverter operative)

D. Close-Up

(1)Shut down **APU** (Ref. 49-00-00, P. Block 501)

(2)On panel **424VU**

- press and release **BAT** pushbutton switches
  - **BAT** pushbutton switch flowbars go off
  - all warning lights go off.
  - static inverter is shut down.

WARNING: ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.
WARNING: OIL DRAINED FROM GENERATOR, CAN STILL BE HOT.

WARNING: AC GENERATOR WEIGHS APPROX. 28 kg (61.7 lb.).

** Pre Tool/Equipment Bulletin M025-002

WARNING: MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
-MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
-DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM, THIS WILL PREVENT DAMAGE TO THE CABLE.

** Post Tool/Equipment Bulletin M025-002

WARNING: WHEN USING HOIST P/N M025B003 OR M026B004 OR M027H004 THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
-MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK, THIS WILL PREVENT DAMAGE TO THE CABLE.

** ON A/C ALL

WARNING: MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED.
KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

A. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 6 m (20 ft.)
R B. 91/541	Hoist - Minilift
** Pre Tool/Equipment Bulletin M025-002	
ALKAN P8.22025B01	Mechanical Hoisting System
or	
ALKAN P/N M026B002	Mechanical Hoisting System
** Post Tool/Equipment Bulletin M025-002	
ALKAN P/N M025B003	Mechanical Hoisting System
or	

ITEM		DESIGNATION
	ALKAN P/N M026B004	Mechanical Hoisting System
	or	
	ALKAN P/N M027H004	Mechanical Hoisting System
** ON A/C ALL		
C.	98A49907616000	Unit - Oil Draining, APU
D.		Blanking Caps and Plugs
E.		Circuit Breaker Safety Clips and Tags
F.		Container, 10 l (2.6 US gal.) capacity
G.		Corrosion-Resistant Steel Lockwire, 0.8 mm (0.032 in.) dia.
H.		Gasket, as required
J.		O-Rings
K.		Torque Wrench, up to 200 lbf.in. (2.0 m.daN).
L.	FRDH 141	Torque Convertor
M.	Material No. 03-002	Oils (Ref. 20-31-00)
	or	
	Material No. 03-003	Oils (Ref. 20-31-00)

(1)Open, safety and tag the following circuit breakers:

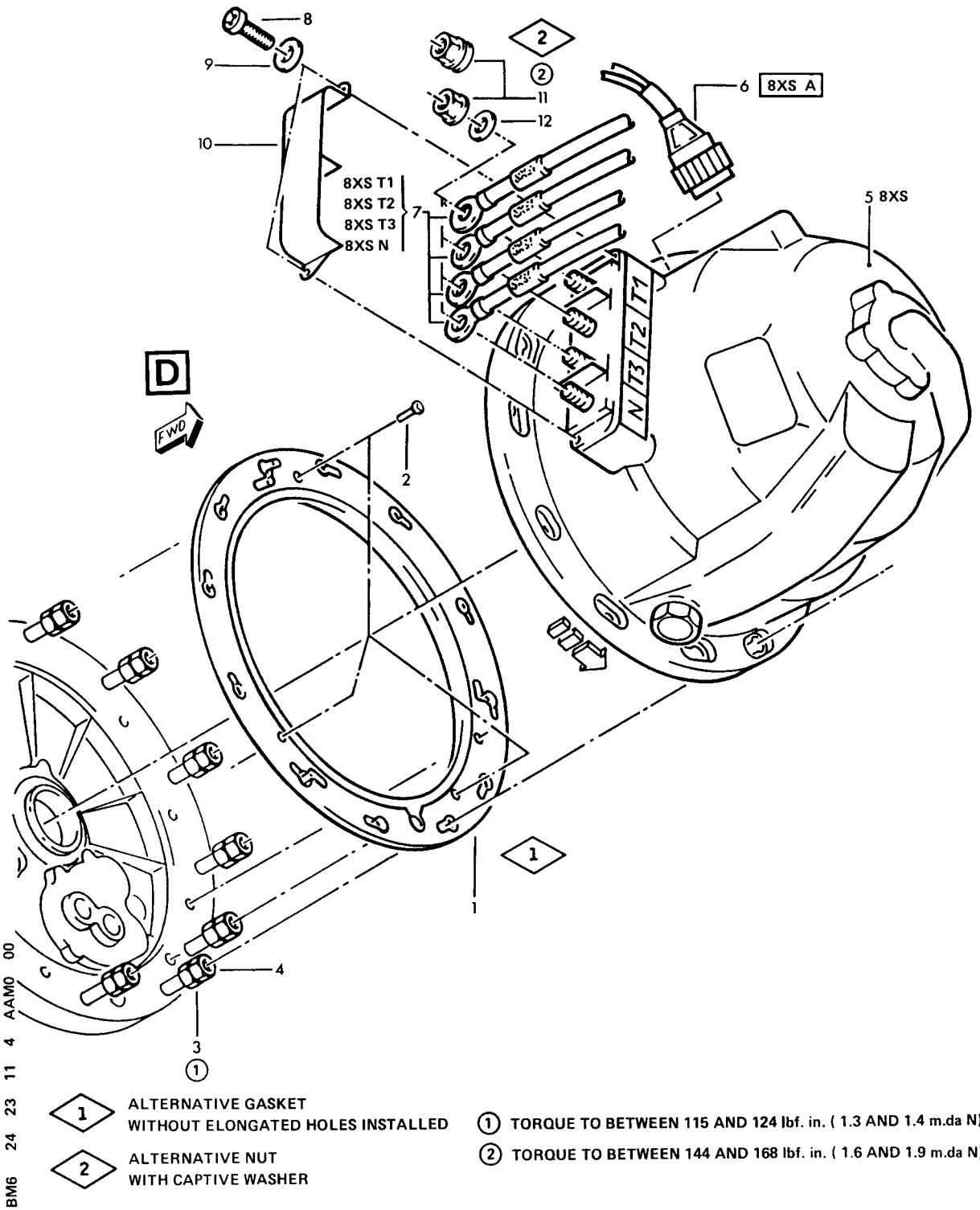
PANEL	SERVICE	IDENT.	LOCATION
131VU	APU/ECB BACK UP/SUPPLY	58KD	B52
131VU	APU/ECB BACK UP/CTL	71KD	B53
131VU	APU/START	50KA	B54
131VU	APU/ECB SUPPLY/MAIN	1KD	B57
133VU	ELEC/APU GEN/GCU/SUPPLY	6XS	U83
133VU	ELEC/APU GEN/GCU/WARN	5XS	U84

(2)Position access platform.
(3)Open access doors 315AL and 316AR.

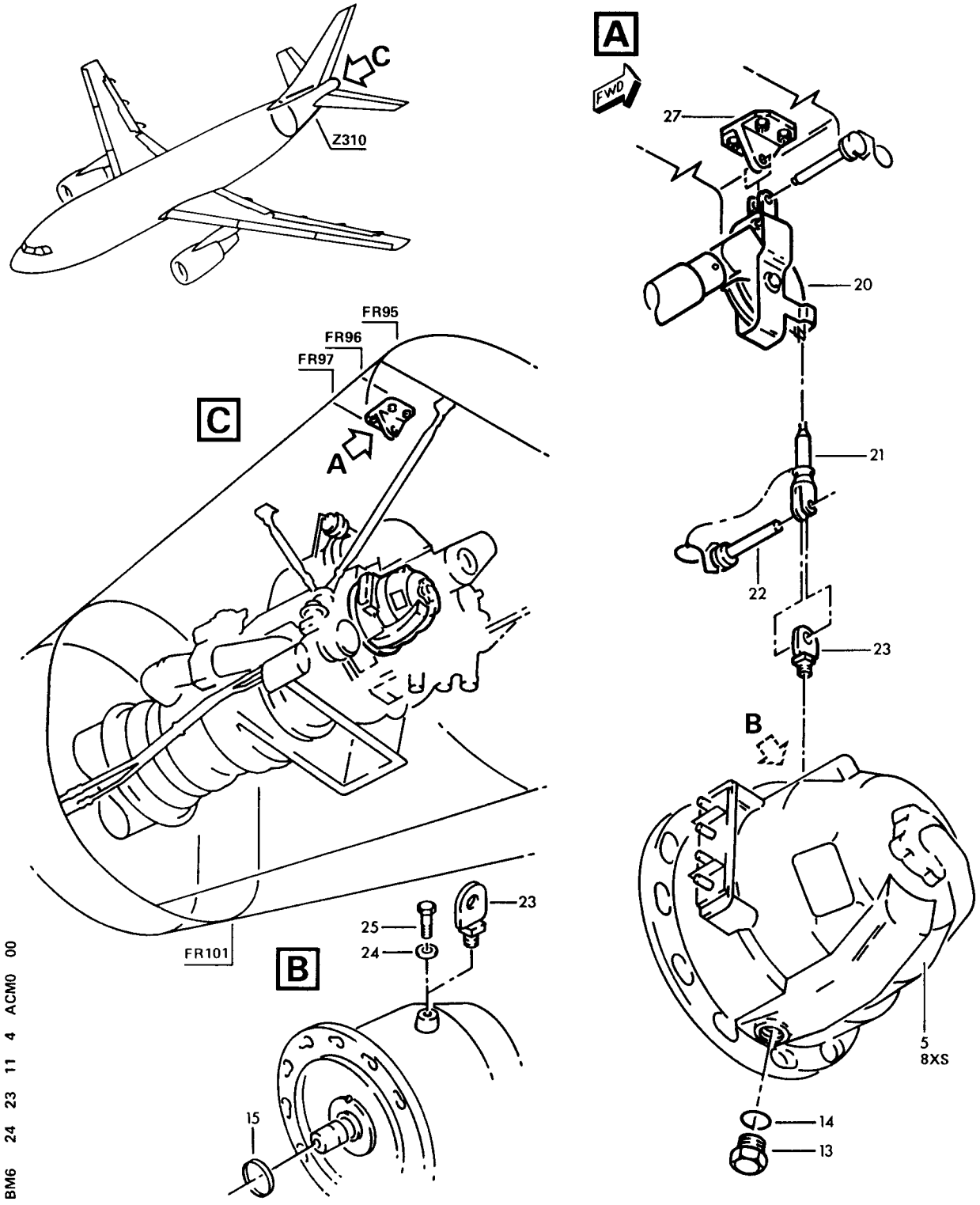
NOTE: Removal of access door 315AL (Ref. 52-41-21, P. Block 401) will ease handling of Hoist.

(4)Remove inlet duct (Ref. 49-16-14, P. Block 401).
(5)Remove oil cooler outlet duct (Ref. 49-52-14, P. Block 401).

B. Removal
(Ref. Fig. 401, 402)
(1)Disconnect electrical connections.
(a)Cut and remove lockwire and disconnect APU generator control connector 8XS-A (6) and install blanking cap and plug.
(b)Cut and remove lockwire and remove bolts (8), washers (9) and cover (10).
(c)Remove nuts (11), washers (12) or alternative nuts with captive washer.



APU AC Generator
Figure 401



APU AC Generator
Figure 402

(d)Disconnect APU generator connections 8XS T1, T2, T3 and N (7).

(2)APU generator oil draining.

(a)Position oil draining unit below generator.

(b)Position container.

WARNING: OIL DRAINED FROM GENERATOR CAN STILL BE HOT.

(3)For APU generators provided with drain plug:

(a)Cut and remove lockwire and remove drain plug (13).

(b)Drain oil.

(c)Remove and discard O-ring (14).

(d)Thinly apply oil (Mat. No. 03-002 or 03-003) to new O-ring (14).

(e)Install new O-ring on drain plug (13).

(f)Install drain plug (13) and safety with lockwire.

(4)Installation of hoist tool.

(a)Remove bolt (25) and washer (24).

R (b)Install APU generator lifting eye (23).

(c)Install hoist (20) to APU compartment generator hoist bracket (27) (Ref. 49-10-00, P. Block 401).

WARNING: AC GENERATOR WEIGHS APPROX. 28 kg (61.7 lb.).

** Pre Tool/Equipment Bulletin M025-002

WARNING: MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
-MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
-DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM, THIS WILL PREVENT DAMAGE TO THE CABLE.

** Post Tool/Equipment Bulletin M025-002

WARNING: WHEN USING HOIST P/N M025B003 OR M026B004 OR M027H004 THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
-MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK, THIS WILL PREVENT DAMAGE TO THE CABLE.

** ON A/C ALL

WARNING: MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED.
KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

R (d)Connect fork-end (21) to lifting eye (23) and install pip pin (22).

(e)Remove load from flange studs.

(5)Removal of APU generator.

CAUTION: TAKE CARE NOT TO DAMAGE THREADS OF STUDS, GENERATOR OIL FILTER HOUSING, BLEED AIR DUCT OR OTHER EQUIPMENT.

CAUTION: BE CAREFUL WHEN YOU REMOVE THE NUTS. A SPANNER CAN EASILY CAUSE DAMAGE TO THE ADJACENT WEBS OF THE GENERATOR HOUSING.

(a)Release nuts.
1 Loosen the locknuts (4) until their front faces are at the ends of the studs.
2 Loosen the nuts (3) until they touch the locknuts (4).

CAUTION: BE CAREFUL WHEN YOU TURN THE GENERATOR. TOOLS THAT YOU USE TO HELP YOU MOVE THE APU GENERATOR CAN EASILY CAUSE DAMAGE TO THE HOUSING. DO NOT APPLY REMOVAL FORCE TO THE WEBS AT THE MAIN FLANGE.

(b)Pull APU generator (5) against nuts (3) and rotate clockwise.

WARNING: OIL DRAINED FROM GENERATOR CAN STILL BE HOT.

(c)Remove APU generator from APU gearbox flange and drain residual oil.

NOTE: For APU generator without drain plug: Oil in generator will drain when generator is released from gearbox flange.

(d)Remove APU oil draining unit and container.
(e)Lower APU generator.

R (6)Remove APU generator lifting eye (23).
(7)Install screw (25) and washer (24).
(8)Remove and discard O-ring (15).
(9)Install blanking caps and plugs to gearbox and generator apertures.

NOTE: When no serviceable APU AC Generator is available install APU AC Generator Substitute (Ref. 24-23-11, P. Block 801).

C. Preparation for Installation

NOTE: Remove APU AC Generator Substitute if installed (Ref. 24-23-11, P. Block 801).

(1)Inspect external surface of AC generator housing assembly for damage.
(a)Replace if necessary.
(2)Inspect the AC generator male splined drive and corresponding female splines in the gearbox for any damage.
(a)Replace if necessary.
(3)Inspect gasket (1) for damage, replace if necessary:
(a)Replace gasket with elongated holes.

1 Remove screws (2).

2 Remove gasket (1) from APU generator flange.
3 Discard gasket (1).
4 Apply oil (Mat. No. 03-002 or 03-003) thinly to new gasket (1).

CAUTION: MAKE CERTAIN THAT APU GENERATOR OIL SUPPLY AND RETURN CONNECTIONS ARE NOT COVERED BY GASKET.

5 Position new gasket (1) and install screws (2).

(b)Replace alternative gasket without elongated holes.
1 Remove locknuts (4) and nuts (3).
2 Remove screws (2) and gasket (1). Discard gasket.
3 Apply oil (Mat. No. 03-002 or 03-003) thinly to new gasket (1).

CAUTION: MAKE CERTAIN THAT APU GENERATOR OIL SUPPLY AND RETURN CONNECTIONS ARE NOT COVERED BY GASKET.

4 Position new gasket (1) and install screws (2).
5 Install nuts (3). Do not tighten at this stage.
6 Install locknuts (4).

D. Preparation of Replacement APU AC Generator.
(1)Position container.
(2)Remove blanking plugs and caps.
(3)Drain preservative oil.
(4)Install blanking plugs and caps.
(5)Remove bolt (25) and washer (24).
(6)Install APU generator lifting eye (23).

E. Installation

(1)Remove blanking caps and plugs from APU generator and gearbox apertures.
(2)Apply oil (Mat. No. 03-002 or 03-003) thinly to APU generator splined shaft and new O-ring (15).
(3)Install new O-ring (15).

WARNING: AC GENERATOR WEIGHS APPROX. 28 kg (61.7 lb.).

** Pre Tool/Equipment Bulletin M025-002

WARNING: MISUSE OF HOIST P/N M025B01 AND HOIST P/N M026B002 IS DANGEROUS AND CAN CAUSE SERIOUS INJURY.
-MAKE CERTAIN THAT THE GEAR SELECTOR IS ENGAGED CORRECTLY AND IS NOT IN THE NEUTRAL POSITION.
-DO NOT CHANGE THE GEAR SELECTION WHEN RAISING OR LOWERING THE LOAD AS THIS WILL ALLOW THE LOAD TO FALL RAPIDLY, OUT OF CONTROL.
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING AND LEAVE AT LEAST ONE COMPLETE TURN ON THE DRUM, THIS WILL PREVENT DAMAGE TO THE CABLE.

** Post Tool/Equipment Bulletin M025-002

WARNING: WHEN USING HOIST P/N M025B003 OR M026B004 OR M027H004

THE FOLLOWING PRECAUTIONS MUST BE OBSERVED:
-MAKE CERTAIN THAT CABLE IS LOADED WITH A MINIMUM OF 10 daN (22.5 lbf.) WHILE WINDING OR UNWINDING.
-MAKE CERTAIN THAT YOU DO NOT UNWIND THE CABLE BEYOND THE RED MARK, THIS WILL PREVENT DAMAGE TO THE CABLE.

** ON A/C ALL

WARNING: MAKE CERTAIN THAT THE CABLE IS NOT KINKED OR TWISTED. KEEP THE CABLE CLEAR OF ANY SHARP OBJECTS THAT CAN DAMAGE IT.

(4)Connect fork-end (21) to lifting eye (23) and install pip pin (22).

CAUTION: MAKE CERTAIN THAT THREADS OF STUDS, GENERATOR OIL FILTER HOUSING, BLEED AIR DUCT OR OTHER EQUIPMENT ARE NOT DAMAGED.

(5)Install APU AC generator.

CAUTION: DO NOT DAMAGE THE GASKET DURING INSTALLATION OF APU GENERATOR.

CAUTION: BE CAREFUL WHEN YOU TURN THE GENERATOR. TOOLS THAT YOU USE TO HELP YOU MOVE THE APU GENERATOR CAN EASILY CAUSE DAMAGE TO THE HOUSING. DO NOT APPLY REMOVAL FORCE TO THE WEBS AT THE MAIN FLANGE.

(a)Position generator (5) and rotate counterclockwise to engage elongated holes.

CAUTION: BE CAREFUL WHEN YOU INSTALL THE NUTS. A SPANNER CAN EASILY CAUSE DAMAGE TO THE ADJACENT WEBS OF THE GENERATOR HOUSING.

(b)TORQUE nuts (3) to between 115 and 124 lbf.in. (1.3 and 1.4 m.daN). (Ref.20-21-12).

NOTE: Use Torque Convertor FRDH 141 to TORQUE the three nuts behind the generator connection box.

(6)Disconnect and remove hoist and APU generator lifting eye (23).
(7)Install bolt (25) and washer (24).
(8)Connect APU generator electrical connections.

CAUTION: DO NOT INSTALL ANY WASHERS UNDERNEATH PHASE LEADS. INSTALL WASHERS ONLY BETWEEN THE TERMINAL NUTS AND PHASE LEADS.

(a)Connect generator connections 8XS T1, T2, T3 and N (7) and install washers (12) and nuts (11) or alternative nuts with captive washers.
(b)TORQUE nuts (11) to between 144 and 168 lbf.in. (1.6 and 1.9 m.daN).
(c)Position cover (10) and install washers (9) and bolts (8).
(d)Secure bolts (8) with lockwire.
(e)Remove blanking cap and plug and connect electrical connector 8XS-A (6). Safety with lockwire.
(f)Install inlet duct (Ref. 49-16-14, P. Block 401).

(g)Install access door 315AL if removed (Ref. 52-41-21, P. Block 401).
(h)Install oil cooler outlet duct (Ref. 49-52-14, P. Block 401).
(j)Check oil level on gearbox sight glass. If near or below ADD mark, replenish APU (Ref. 12-13-49, P. Block 1).

(k)Remove safety clips and tags and close circuit breakers 50KA, 1KD, 58KD, 5XS, 6XS and 71KD.

F. Functional Test
(1)Start and operate APU (Ref. 49-10-00, P. Block 501).
(2)Set generator on line and check AC-LOAD, AC-V and FRQ-HZ indications.
(3)Shut down APU (Ref. 49-10-00, P. Block 501).

WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

(4)Check APU generator for oil leakage.

G. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors 315AL and 316AR and remove access platform.

WARNING : THE APU GENERATOR SUBSTITUTION KIT MUST BE INSTALLED WHEN GENERATOR IS REMOVED AND APU IS REQUIRED FOR USE. INSTALLATION OF GENERATOR SUBSTITUTION KIT IS A TEMPORARY MEASURE UNTIL A GENERATOR IS FITTED.

WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

NOTE : APU AC Generator substitution parts are colored red.

1. Reason for the Job

R This procedure is not applicable for Extended Range Twin Engine Airplane Operations (ETOPS) and Standby Generator 25XE inoperative or not installed.

R 2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 6 m (20 ft.)
B. 3862212-2	Blanking Plate
C. 19A49070162000	Cable Support - Generator
D.	Torque Wrench, up to 150 lbf.in. (1.7 m.daN)
E.	External Power - 3-Phase, 115/200 V, 400 Hz
F.	Container, 2 l (0.52 US Gal.) Capacity

Referenced Procedures

- 24-23-11, P. Block 401	APU AC Generator (8XS)
- 24-41-00, P. Block 301	AC External Power Control
- 49-10-00, P. Block 401	Power Plant
- 49-10-00, P. Block 501	Power Plant
- 49-16-14, P. Block 401	Inlet Duct
- 49-52-14, P. Block 401	Oil Cooler Outlet Duct
- 52-41-21, P. Block 401	APU Access Doors

R 3. Installation of APU AC Generator Substitute

A. Job Set-Up

(1)Make certain that the following circuit breakers are opened, safetied and tagged:

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU/ECB BACK UP/SUPPLY	58KD	B52
131VU	APU/ECB BACK UP/CTL	71KD	B53
131VU	APU/START	50KA	B54
131VU	APU/ECB SUPPLY/MAIN	1KD	B57
133VU	ELEC PWR/APU GEN/GCU/SUPPLY	6XS	U83
133VU	ELEC PWR/APU GEN/GCU/WARN	5XS	U84

(2)Position access platform.

(3)Open access doors 315AL and 316AR.

(4)Remove APU AC generator (Ref. 24-23-11, P. Block 401).
(5)Remove APU R/I Hoist.

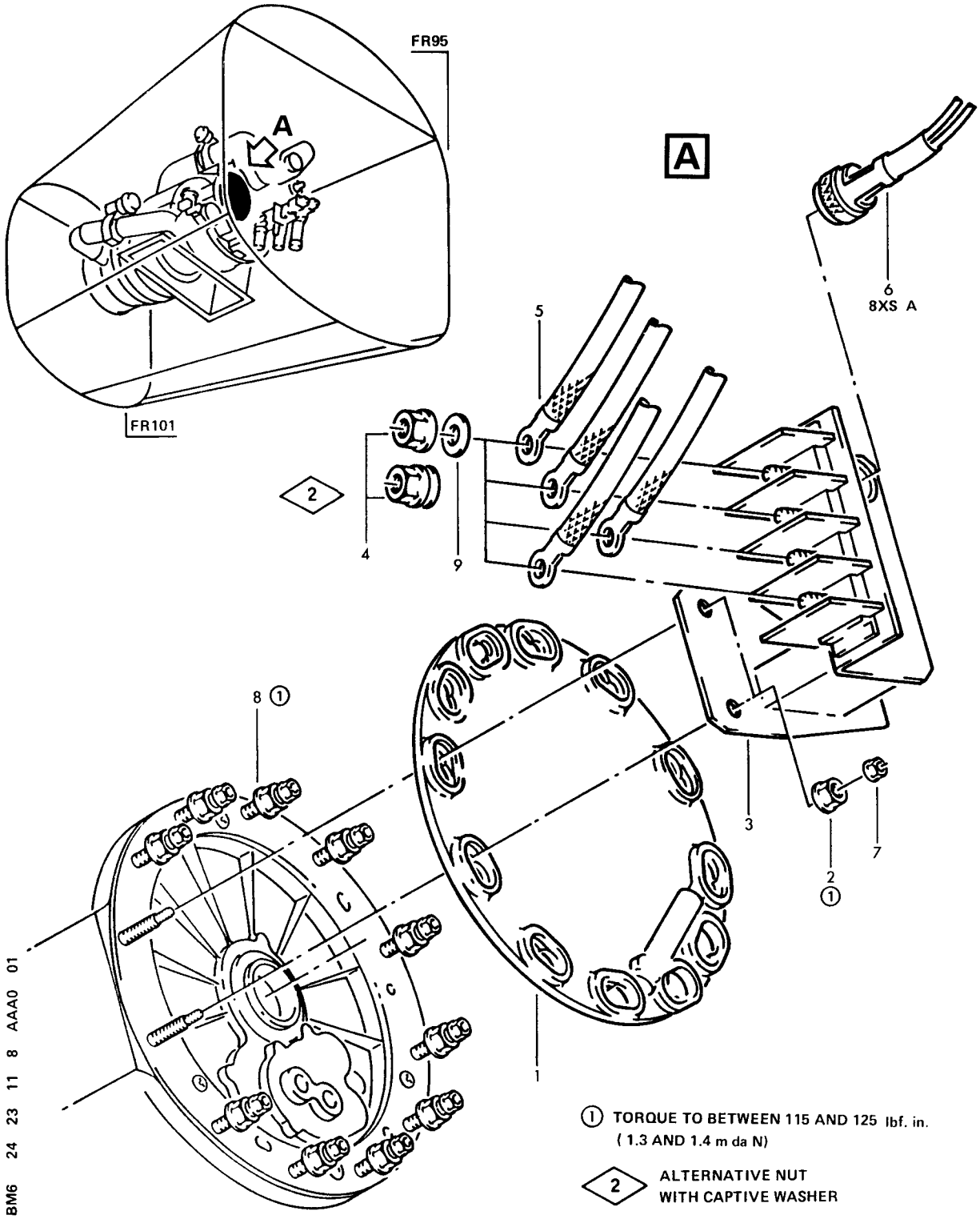
B. Installation
(Ref. Fig. 801)
(1)Inspect gearbox flange gasket. Replace if necessary (Ref. 24-23-11, P. Block 401).
(a)Remove blanking caps and plugs.
(2)Remove locknuts (7) and nuts (2).
(3)Position blanking plate (1) and rotate counterclockwise to engage longitudinal holes.
(4)Tighten nuts (8).
(5)Position AC generator cable support (3) with cable connection board vertical.
(6)Install nuts (2) and locknuts (7).
(7)TORQUE nuts (2, 8) to between 115 and 125 lbf.in. (1.3 and 1.4 m.daN)
(8)Remove nuts (4), washers (9) or alternative nuts with captive washer.
(9)Connect generation cables 8XS T1, T2, T3 and N (5).
(10)Install nuts (4), washers (9) or alternative nuts with captive washer.
(11)Remove blanking plug and connect AC generator control cable 8XS-A (6).
(12)Install inlet duct (Ref. 49-16-14, P. Block 401).
(13)Install access door 315AL, if removed (Ref. 52-41-21, P. Block 401).
(14)Install oil cooler outlet duct (Ref. 49-52-14, P. Block 401).

C. Test
(1)Connect electrical ground power unit and energize the aircraft electrical network (Ref.24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)Remove safety clips and tags and close circuit breakers 1KD, 50KA, 58KD and 71KD.
NOTE : Make certain that circuit breakers 5XS and 6XS remain opened, safetied and tagged.
(4)Start and operate APU (Ref. 49-10-00, P. Block 501).
(5)Shut down APU (Ref. 49-10-00, P. 501).
WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.
(6)Check AC generator for oil leakage.
(7)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

D. Close-Up
(1)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(2)Close access doors 315AL and 316AR and remove access platform.
(3)Make an entry in the aircraft technical log.

R 4. Removal of AC Generator Substitute
WARNING : ALLOW APU TO COOL SUFFICIENTLY TO PREVENT PERSONAL INJURY.

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:



APU AC Generator-Substitute
Figure 801

R

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU/ECB SUPPLY/BACK UP	58KD	B52
131VU	APU/ECB BACK UP/CTL	71KD	B53
131VU	APU/START	50KA	B54
131VU	APU/ECB SUPPLY/MAIN	1KD	B57

(2)Make certain that the following circuit breakers are opened, safetied and tagged:

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC PWR/APU GEN/GCU/SUPPLY	6XS	U83
133VU	ELEC PWR/APU GEN/GCU/WARN	5XS	U84

(3)Position access platform and open access doors 315AL and 316AR.
(4)Remove inlet duct (Ref. 49-16-14, P. Block 401).
(5)Remove oil cooler outlet duct (Ref. 49-52-14, P. Block 401).
(6)Install APU R/I Hoist (Ref. 49-10-00, P. Block 401).

B. Removal
(1)Disconnect AC generator control cable 8XS-A (6) and install blanking plug.
R (2)Remove nuts (4), washers (9) or alternative nuts with captive washer.
R (3)Disconnect generation cables 8XS T1, T2, T3 and N (5).
R (4)Attach nuts (4), washers (9) or alternative nuts with captive washer, do not tighten at this stage.
R (5)Remove locknuts (7), nuts (2) and cable support (3).
R (6)Position container below gearbox flange.
R (7)Release nuts (8) and rotate counterclockwise until touching locknuts.
R (8)Pull blanking plate (1) against nuts (8) and rotate clockwise.
R (9)Remove blanking plate (1).
R (10)Install blanking caps and plugs.
R (11)Remove container.
R (12)Position nuts (2, 7) on studs. Tighten locknuts (7). Rotate nuts (2) counterclockwise until touching locknuts.

C. Close-Up
(1)Install APU AC generator (Ref. 24-23-11, P. Block 401).
(2)Make certain that working area is clean, and clear of tools and miscellaneous items of equipment.
(3)Close access doors 315AL and 316AR and remove access platform.
(4)Remove safety clips and tags and close circuit breakers 50KA, 1KD, 58KD, 71KD, 5XS and 6XS.
(5)Delete entry in aircraft in technical log.

APU GENERATOR CONTROL UNIT 1XS - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 24-41-00, P. Block 501	AC External Power Control

2. Procedure

A. Job Set-Up (Ref. Fig. 401)

NOTE : It is recommended that GCU be removed/installed only after APU has been shut down.

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On panel 424VU
- Make certain that APU GEN pushbutton switch is released (OFF legend is ON).

(4)Open access door 121BL.
(5)In avionics compartment on GPCU 7XG, perform a PERIODIC TEST and note system state.

CAUTION : DO NOT PERFORM A "MEMORY CLEAR" ON GPCU 7XG BEFORE REMOVAL OF GCU NOT TO ERASE GCU NVM.

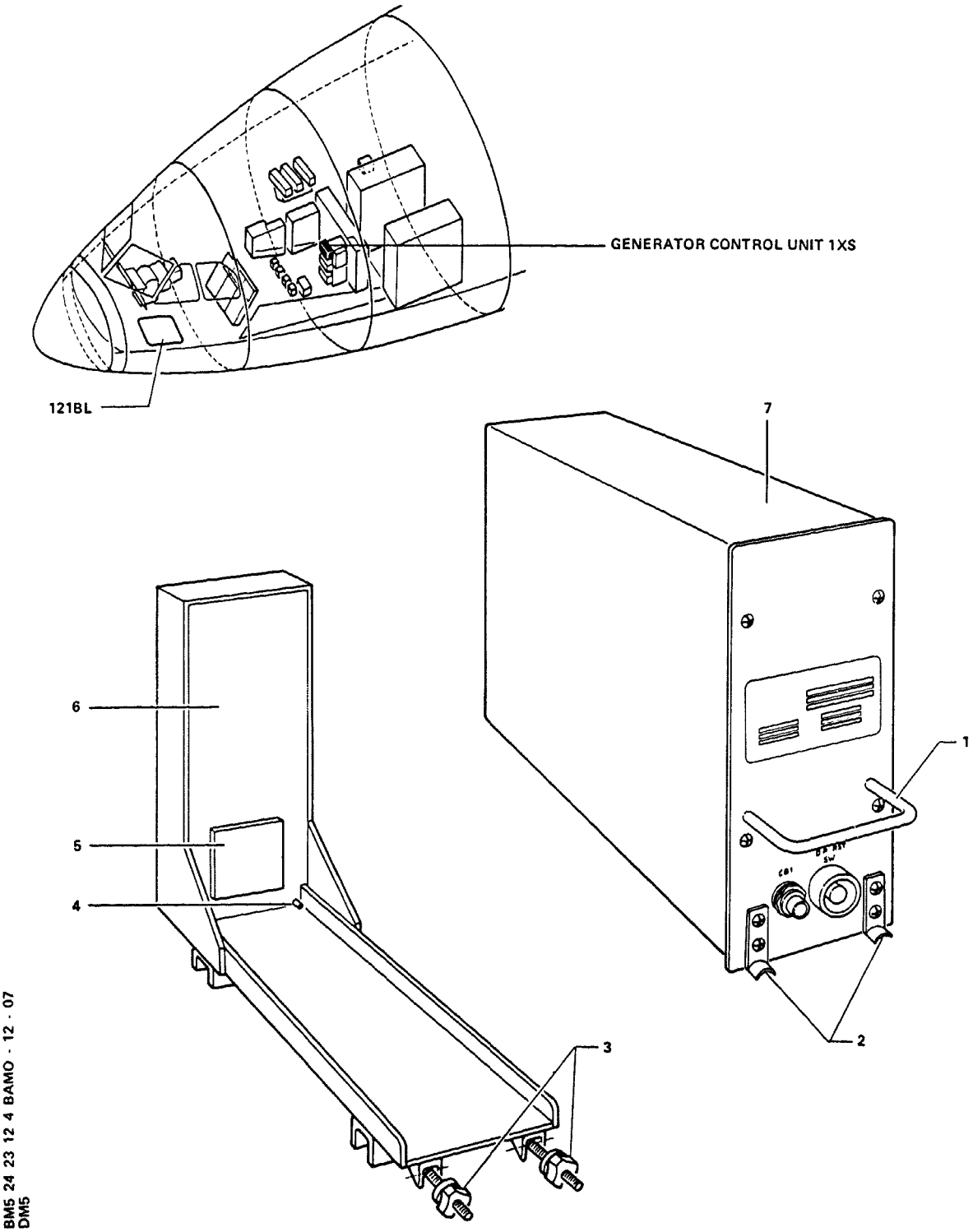
(6)On flight compartment overhead panel 424VU, press and release ELEC PWR/EXT PWR pushbutton switch 10XG :
- AVAIL legend comes on
- ON legend goes off.

(7)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/APU GEN/GCU WARN	5XS	332/U84
133VU	ELEC/APU GEN/GCU SUPPLY	6XS	332/U83
133VU	ELEC/EXT PWR/GND SVCE CTL	6XG	334/S83

B. Removal
(1)Loosen the two locking screws (3).
(2)Lower the two locking screws (3) to free attachment lugs (2).
(3)Using handle (1), pull the generator control unit (7) out until connector (5) and centering pins (4) disengage.
(4)Remove control unit from mount (6).
(5)Install plastic shipping cap on the electrical connector of the unit to protect the connector from damage and contamination.

C. Installation
(1)Remove plastic shipping cap on the electrical connector.
(2)Slide generator control unit (7) along mount (6).
(3)Push the generator control unit up to the end of the mount (6) to engage



AC Generation - APU GCU 1XS - Avionics Compartment
Figure 401

connector (5) and centering pins (4).
(4)Engage locking screws (3) with the attachment lugs (2).
(5)Tighten locking screws (3).

D. Close-Up
(1)Remove safety clips and tags and close circuit breakers 5XS, 6XS and 6XG.
(2)In flight compartment, overhead panel, press ELEC PWR/EXT PWR pushbutton switch 10XG (ON legend comes on).
(3)Perform a MEMORY CLEAR to reset the NVM of GCU1 (1XU), GCU2 (2XU), APU GCU (1XS) and GPCU (7XG) (Ref. 24-41-00, P. Block 501).
(4)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(5)Close access door 121BL.

APU GEN PWR LINE CONTACTOR 3XS - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
Referenced Procedure - 24-23-00, P. Block 301	Auxiliary AC Generation *

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.
NOTE : This is to avoid 115 volt on contactors which are upstream of EXT PWR line contactor.
(2) Open access door 121BL.
(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT1, 2, 3, APU GEN and BAT OVRD pushbutton switches.
(4) In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting APU start.
(5) In avionics compartment, remove APU GEN door from AC power center 101VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1) Disconnect connector (5).
(2) Remove nuts (3) and remove power connections.
(3) Remove the four screws (1) and washers (2).
(4) Retain contactor (4).

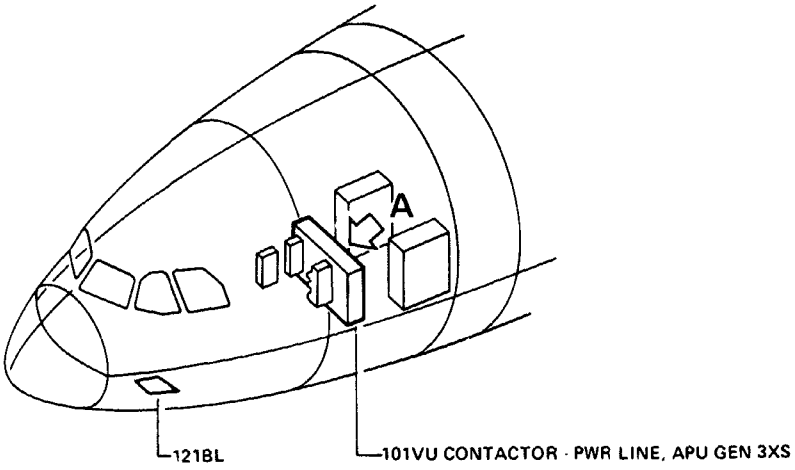
C. Installation

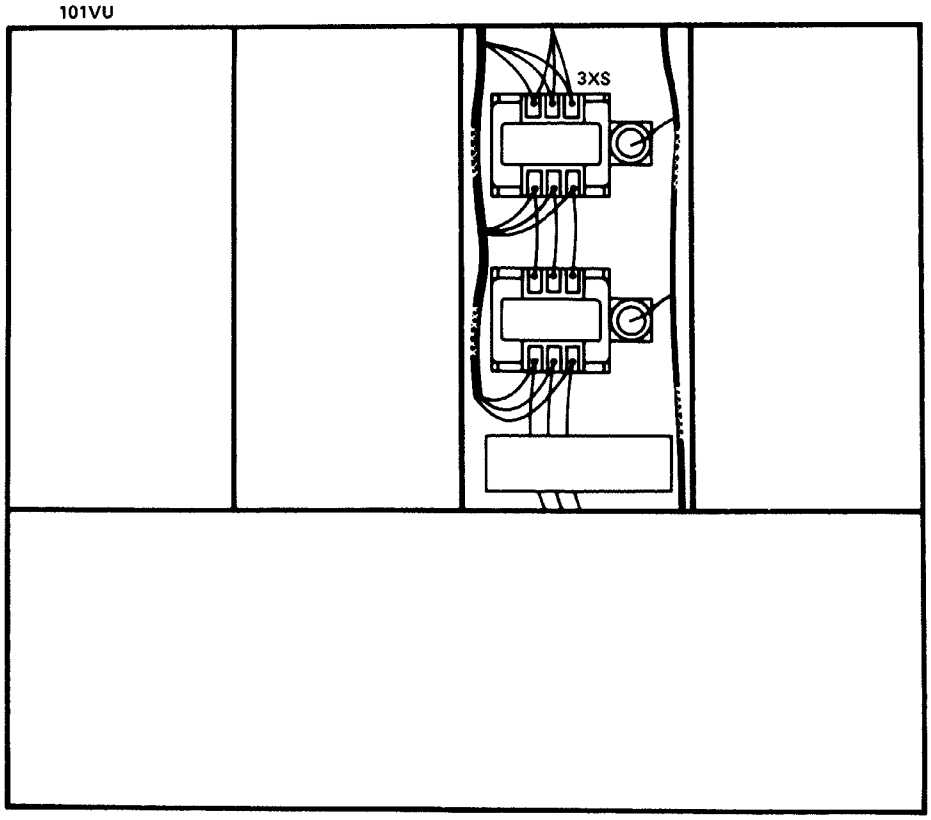
CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1) Position contactor (4) and secure with the four screws (1) and washers (2).
(2) Secure the different power connections with nuts (3).
R (3) TORQUE nuts (3) to between 0.9 and 1 m.daN (79.65 and 88.49 lbf.in.).
R (4) Connect connector (5).
R (5) Supply aircraft electrical network by APU generator (Ref. 24-23-00, P. Block 301). * *

D. Close-Up

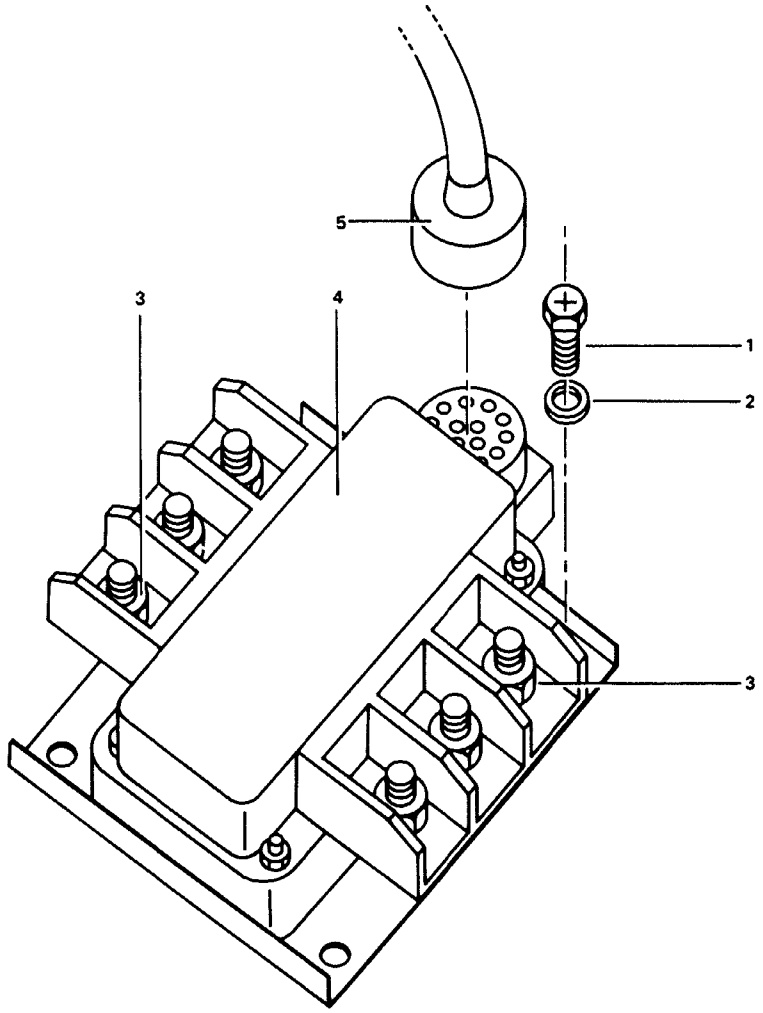
(1) Install door(s) on AC power center 101VU.





BM5 24 23 13 4 BAMO - 12 - 07
DM5

APU GEN PWR LINE Contactor - Location
Figure 401



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APU GEN PWR LINE Contactor
Figure 402

(2)Close access door 121BL.
(3)In flight compartment, on overhead panel 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

CURRENT TRANSFORMER 9XS - APU GENERATOR - REMOVAL/INSTALLATION

**WARNING : MAKE SURE THAT NO AC OR DC POWER SOURCE IS CONNECTED TO THE AIRCRAFT ELECTRICAL CIRCUITS.
THERE IS A RISK OF ELECTROCUTION IF THE AC OR DC POWER STAYS CONNECTED.**

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notices
C.	Blanking Caps
D.	Cable Ties
Referenced Procedures	
- 24-24-00, P. Block 501	Emergency AC Generation
- 24-27-00, P. Block 501	AC Monitoring and Indicating
- 24-32-00, P. Block 501	DC Normal Generation
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 501	Green Auxiliary Power (Optional)

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

(1) In flight compartment, on overhead ELEC PWR panel 424VU, make sure these pushbutton switches are released : BAT OVRD, BAT 1, 2, 3, OVRD SUPPLY 1, 2, GEN 1, GEN 2, APU GEN, EXT PWR.

(2) In flight compartment, on overhead ELEC PWR panel 424VU, put a warning notice to tell persons not to operate the pushbutton switches.

(3) In flight compartment, on overhead panel 429VU, APU section, install a warning notice prohibiting APU start.

(4) Put a warning notice in position on the door 121EL to tell persons not to connect the external power connector to the aircraft EXT PWR receptacle.

(5) Open access door 121BL.

(6) In avionics compartment, remove APU door from AC power center 101VU.

B. Removal

CAUTION : MAKE MATCH MARKS ON ALL THE ELECTRICAL WIRES BEFORE YOU DISCONNECT THEM. INCORRECT CONNECTION OF WIRES WILL CAUSE DAMAGE TO EQUIPMENT.

(1) On panel 101VU, identify all the circuit breakers connected to the AC BUS 1 and 2 busbars 1XP and 2XP.

(2) Disconnect the wires connected to pin 2 of these circuit breakers.

NOTE : You must remove all the wire bundles between the circuit breakers and the current transformer. Identify the wires before the removal.

(3) Remove the nuts (2) and the feeders (3) from the contactor (1).

NOTE : You must remove all the feeders between the contactor and the current transformer.

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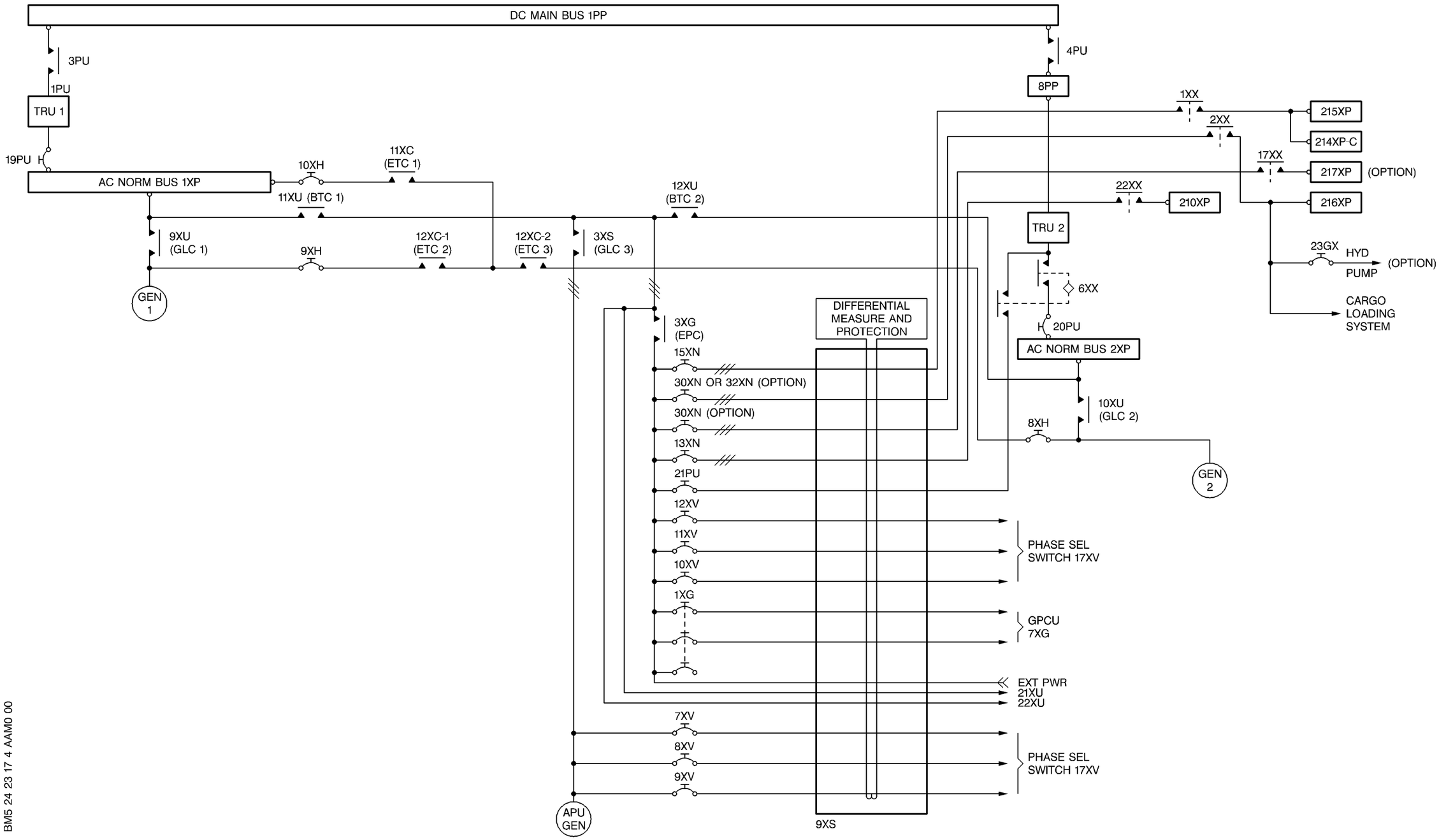
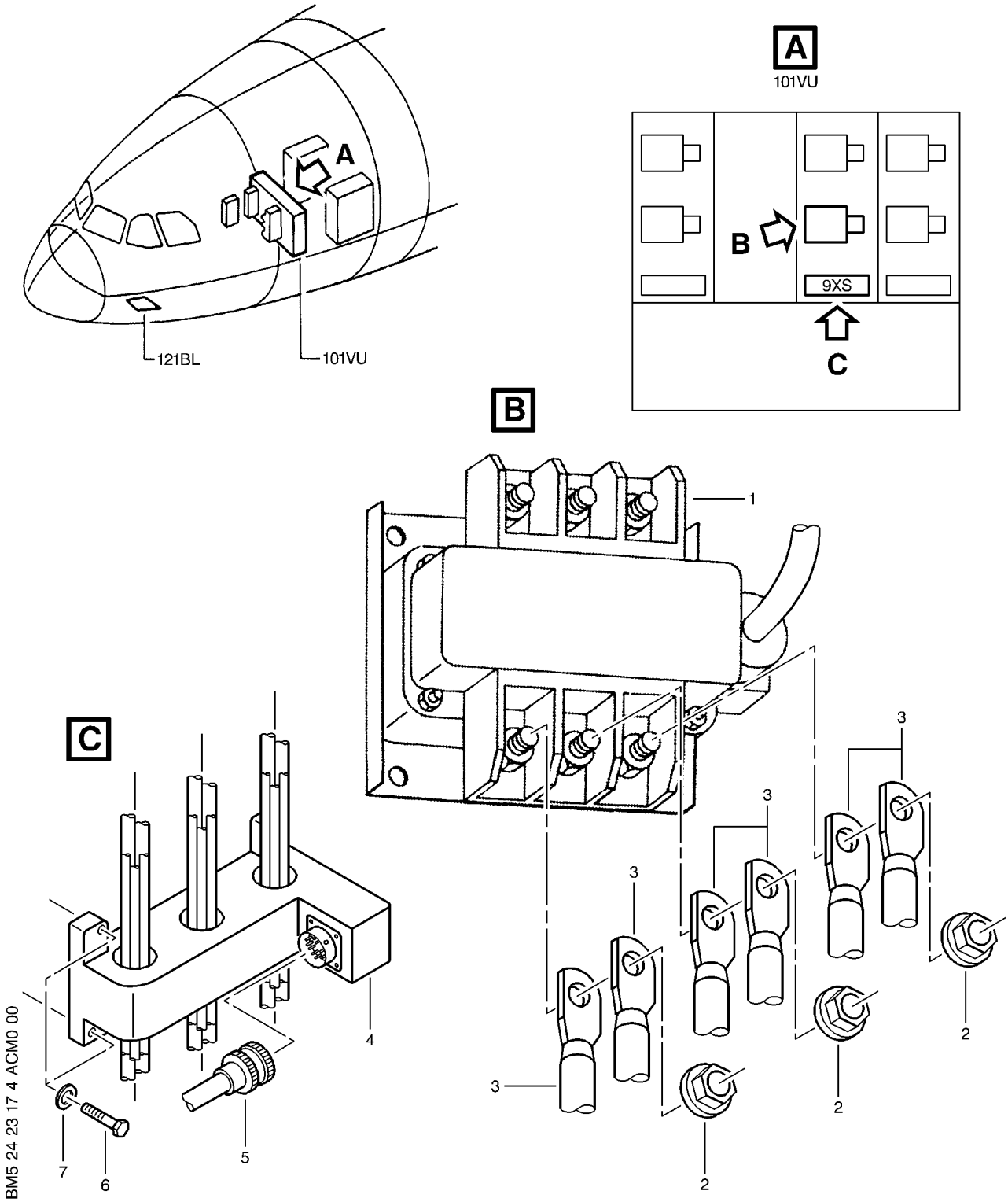


BM5 24 23 17 4 AAM0 00

AC Current Transformer - Block Diagram
Figure 401



Current Transformer (9XS)
Figure 402

Identify the feeders before the removal.

(4)Record the location and the color of the wire bundles on the current transformer (4).

(5)Disconnect the electrical connector (5) from the contactor (1).

(6)Put blanking caps on the disconnected electrical connector and electrical receptacle.

(7)Remove the four bolts (6) and washers (7) from the current transformer (4).

(8)Cut the cable ties and move the current transformer (4) up along the wire bundles to remove it.

C. Installation

(1)Put the disconnected wire bundles through the current transformer (4). Make sure that the location and the colors of the wire bundles agree with those recorded at removal.

(2)Move the current transformer (4) along the wire bundles.

(3)Install the washers (7) and the bolts (6) on the current transformer (4) and tighten them.

(4)Remove the blanking caps from the electrical connectors.

(5)Make sure that the electrical connectors are clean and in the correct condition.

(6)Connect the electrical connector (5) to the current transformer (4).

NOTE : Between the contactor (1) and the current transformer (4) identify and attach the wire bundles.

(7)Install the feeders (3) and the nuts (2) on the contactor (1) and tighten them.

NOTE : Between the circuit breakers and the current transformer (4), identify and attach the wire bundles with cable ties.

(8)On panel 101VU, connect all the wires at pin 2 of the circuit breakers to the AC BUS 1 and 2 busbars 1XP and 2XP.

NOTE : Make sure that the location of the wires agrees with that recorded at removal.

D. Preparation before Test

(1)Make sure that the work area is clean and clear of tool(s) and other items.

(2)In avionics compartment, install APU door on AC power center 101VU.

(3)Close access door 121BL.

E. Test

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2)Carry out the operational test of the static inverter (Ref. 24-24-00, P. Block 501).

(3)Carry out the operational test of the AC indicating system (Ref. 24-27-00, P. Block 501).

(4)Carry out the operational test of the DC normal generation (Ref. 24-32-00, P. Block 501).

(5)If applicable, carry out operational tests of the Green auxiliary power indicating circuit and electric pump operation (Ref. 29-21-00, P. Block 501).

F. Close-Up
(1) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2) In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.
(3) Remove warning notice prohibiting use of external power receptacle from door 121EL.

EMERGENCY AC GENERATION - DESCRIPTION AND OPERATION

1. General

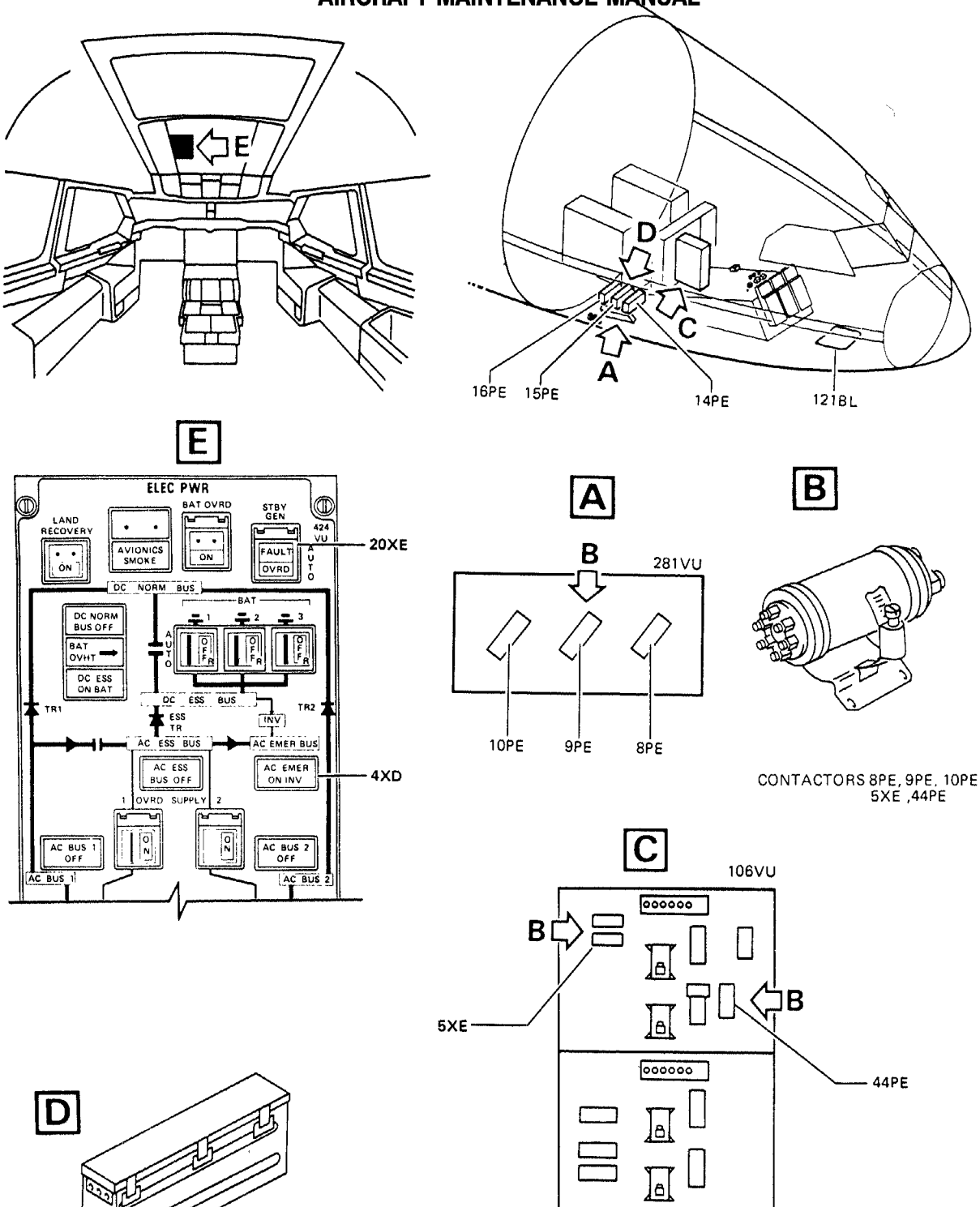
The emergency AC generation enables part of the distribution network to be recovered in case of loss of the two main generation sources and of non availability of the auxiliary generation (emergency configuration).
The emergency AC generation can be obtained from two different ways and is mainly composed of :

- the 5000VA, AC three-phase, 115 volts standby generator which is driven by a hydraulic motor driven by the Green hydraulic system and which mainly supplies the AC emergency busbar and a part of the AC essential busbar
- a 1000VA single-phase static inverter supplied by the onboard batteries through the DC essential busbar and essentially supplying the AC emergency busbar.
  It should be noted that the static inverter may also be used for refuel/defuel operations on the ground when no electrical ground power unit is available (Ref. 24-57-00).

2. Component Location

(Ref. Fig. 001, 003)
(Ref. Fig. 002)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	8PE	CNTOR-BAT3	281VU	122	121BL	24-31-00
	9PE	CNTOR-BAT2	281VU	122	121BL	24-31-00
	10PE	CNTOR-BAT1	281VU	122	121BL	24-31-00
	14PE	BATTERY 1		122	121BL	24-31-11
	15PE	BATTERY 2		122	121BL	24-31-11
	16PE	BATTERY 3		122	121BL	24-31-11
	44PE	CNTOR-STANDBY	106VU	122	121BL	24-31-00
	11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11
	12XC	CNTOR-ESS BUS GEN 1/2 SUPLLY	101VU	121	121BL	24-25-11
	4XD	INDICATOR LIGHT-AC EMER ON INV	424VU	211		24-24-00
	4XE	STATIC INVERTER		120	121BL	24-24-11
	5XE	CNTOR-STATIC INVERTER	106VU	122	121BL	24-24-00
	20XE	P/BSW-ELEC PWR/STBY GEN	424VU	211		24-24-00
	25XE	GENERATOR-STANDBY		140		24-24-51
	26XE	GCU-STANDBY GENERATOR		122	121BL	24-24-34
	15XE	CNTOR-STANDBY	101VU	121	121BL	24-24-55
R	33XE	SELECTOR VALVE		147		24-24-52
	40XE	LIGHTNING PROTECTION UNIT	101VU	121	121BL	24-24-00
	9XU	CNTOR-GEN 1 LINE	101VU	121	121BL	24-22-15
	10XU	CNTOR-GEN 2 LINE	101VU	121	121BL	24-22-15
	11XU	CNTOR-TRANSFER, SYS 1	101VU	121	121BL	24-22-18
	12XU	CNTOR-TRANSFER, SYS 2	101VU	121	121BL	24-22-18



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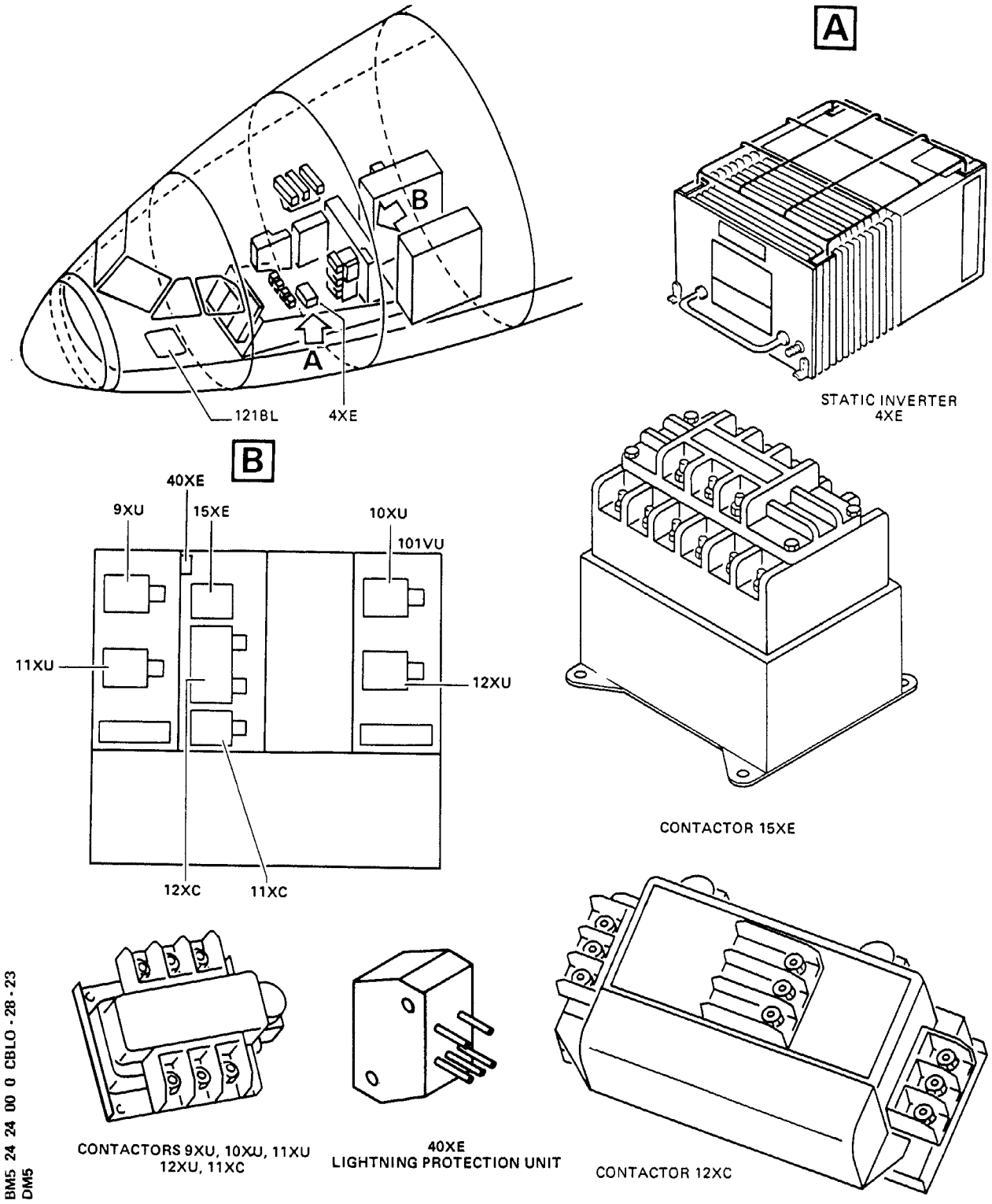
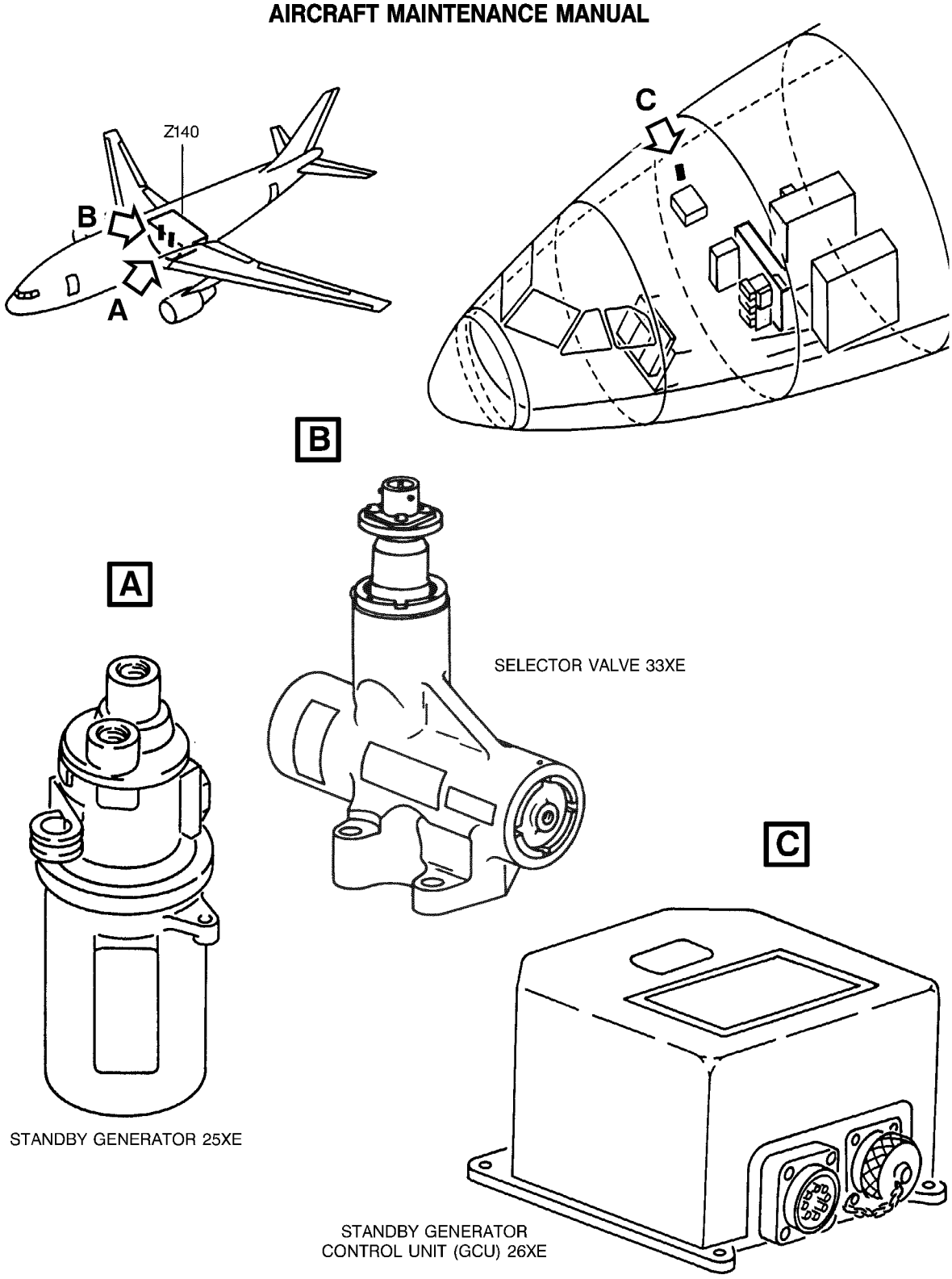
Emergency AC Generation - Component Location
Figure 001



Emergency AC Generation - Component Location
Figure 002



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Emergency AC Generation - Component Location
Figure 003

R

3. Control and Indicating Circuits
(Ref. Fig. 004)

R **ON A/C 001-003,

(Ref. Fig. 005)

R **ON A/C ALL

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 006)

R **ON A/C ALL

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 007)

R **ON A/C 001-003,

(Ref. Fig. 008)

R **ON A/C ALL

- in normal configuration, the emergency busbar is supplied by the essential busbar.

The essential busbar is normally supplied by normal busbar 1, or in certain fault configurations, directly by either generator 1 or 2 (Ref. 24-25-00)

- in the event of loss of the two main generators and the auxiliary generator (three supply contactors are open), a part of the essential busbar (**AC ESS BUS 3XP-2**) and the emergency busbar is transferred to the standby generator which starts automatically.

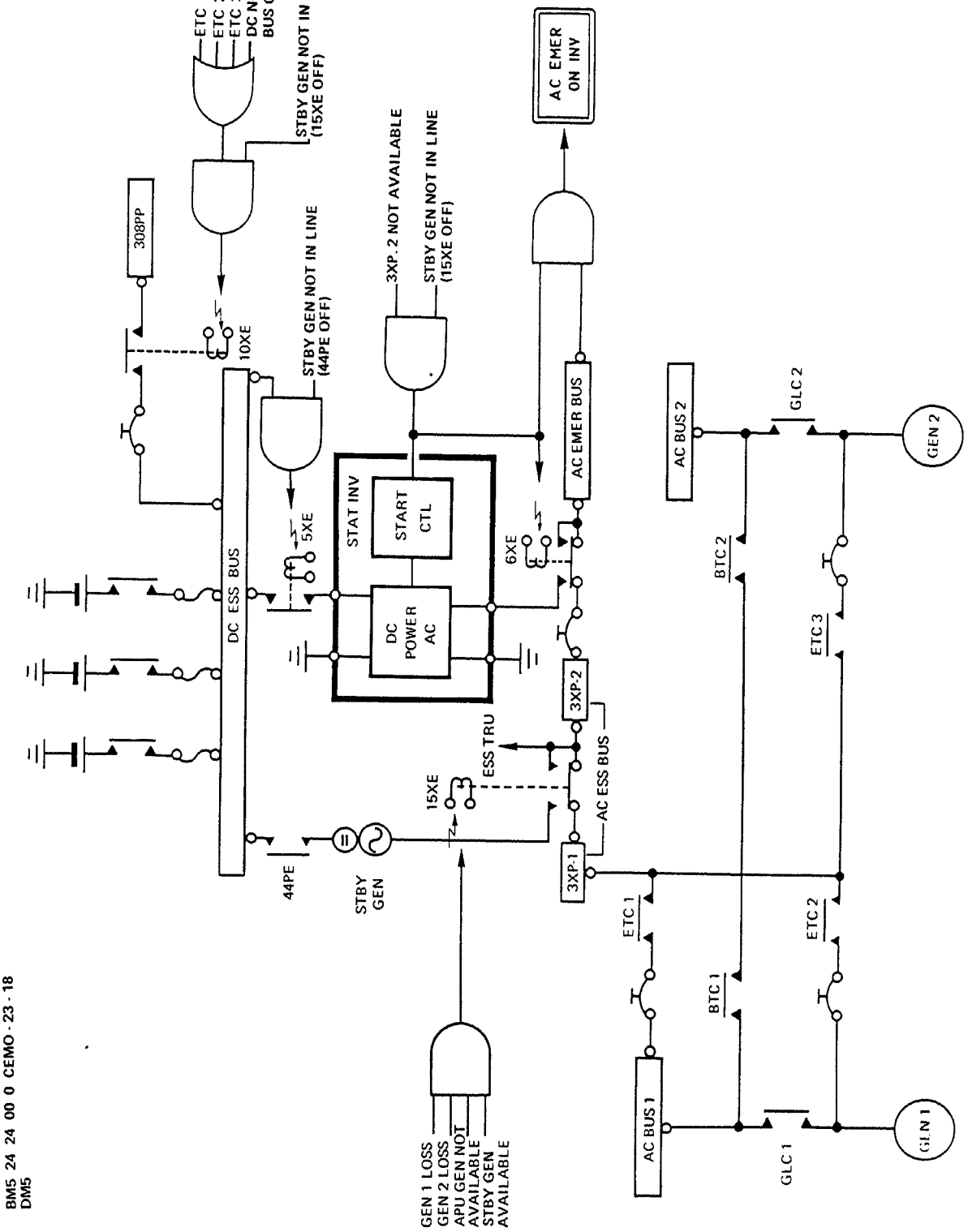
The operation of the standby generator is controlled from the flight compartment overhead panel by means of **ELEC PWR/STBY GEN** pushbutton switch with two stable positions :

- **AUTO** : the pushbutton switch is released (out) ; standby generator coupling and uncoupling are automatically controlled.
- **OVRD** : the pushbutton switch is pressed (in) ; the standby generator is manually started, the **OVRD** legend comes on white.

The **FAULT** legend on the **STBY GEN** pushbutton switch comes on amber to indicate failure of the standby generator operation.

- in the event of non availability of the standby generator, the emergency busbar is transferred to the static inverter which starts automatically. The **AC ESS BUS OFF, AC EMER ON INV** and **DC ESS ON BAT** lights located on the flight compartment overhead panel, section **ELEC PWR,** come on to indicate the static inverter configuration (while these lights are off in the standby generator configuration).

NOTE : In normal flight configuration the static inverter is permanently



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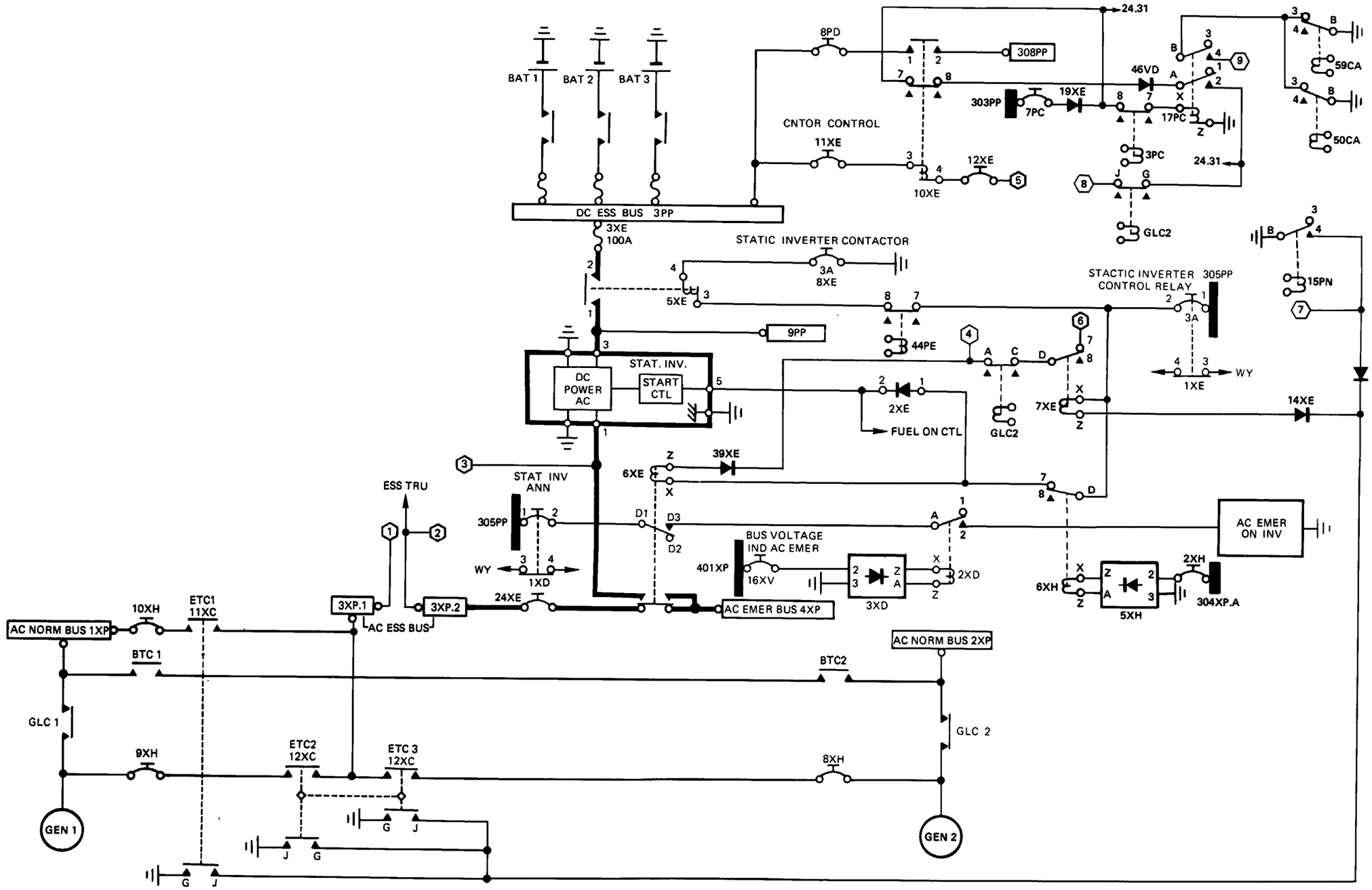
Emergency AC Generation - Control and Indicating - Schematic
Figure 004



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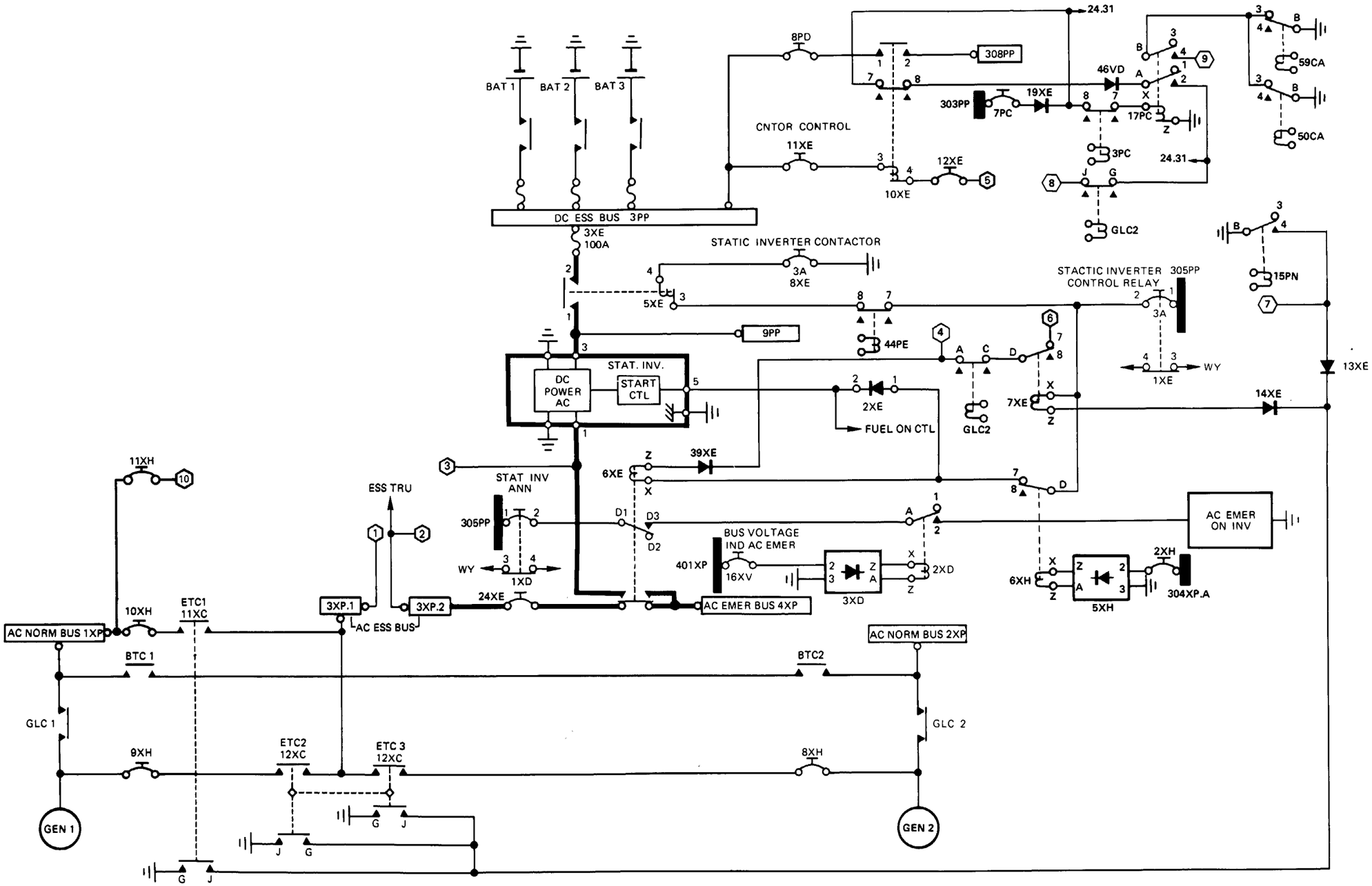
Emergency AC Generation - Control and Indicating Circuits
Sheet 1/2
Figure 005



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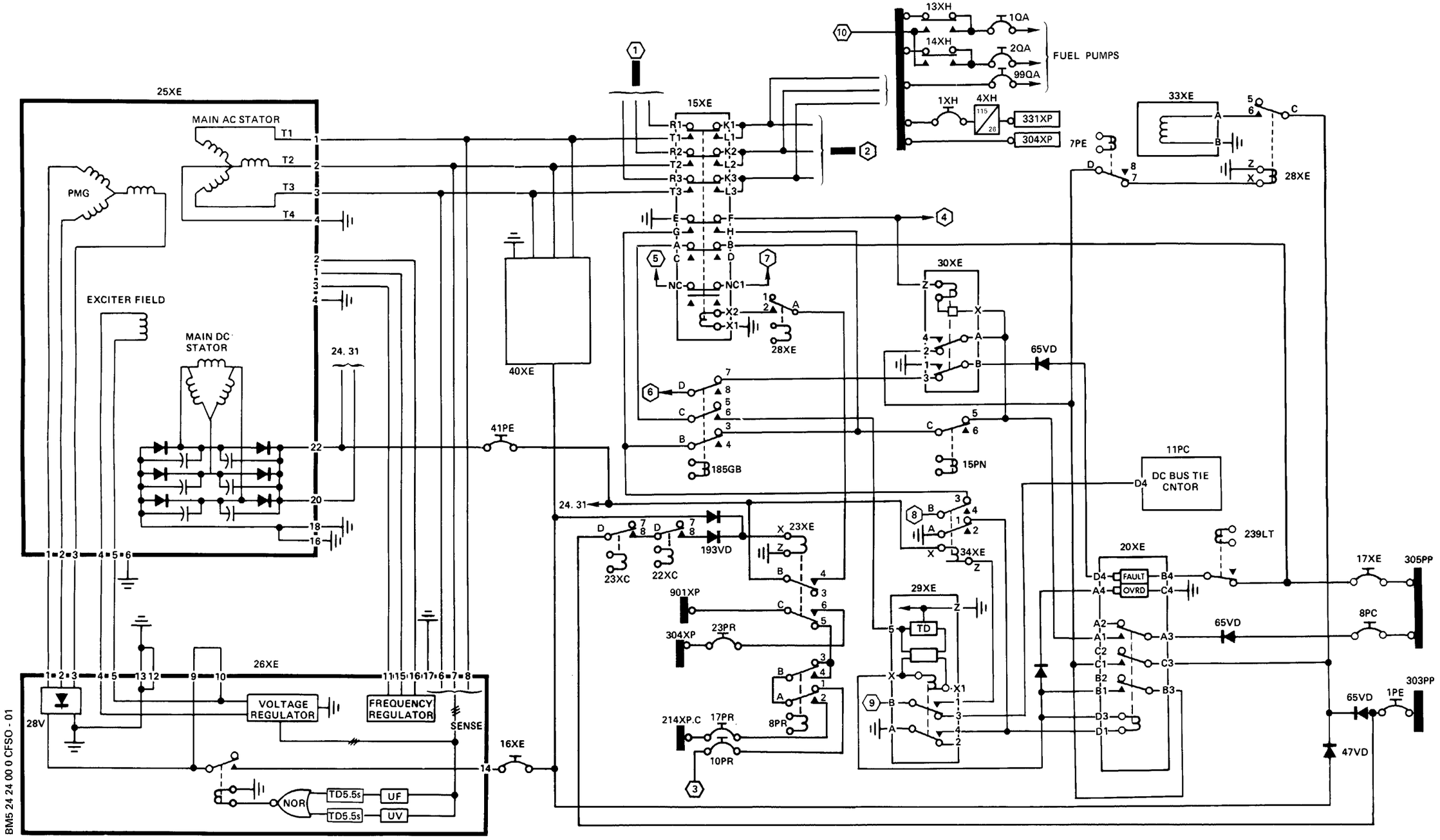
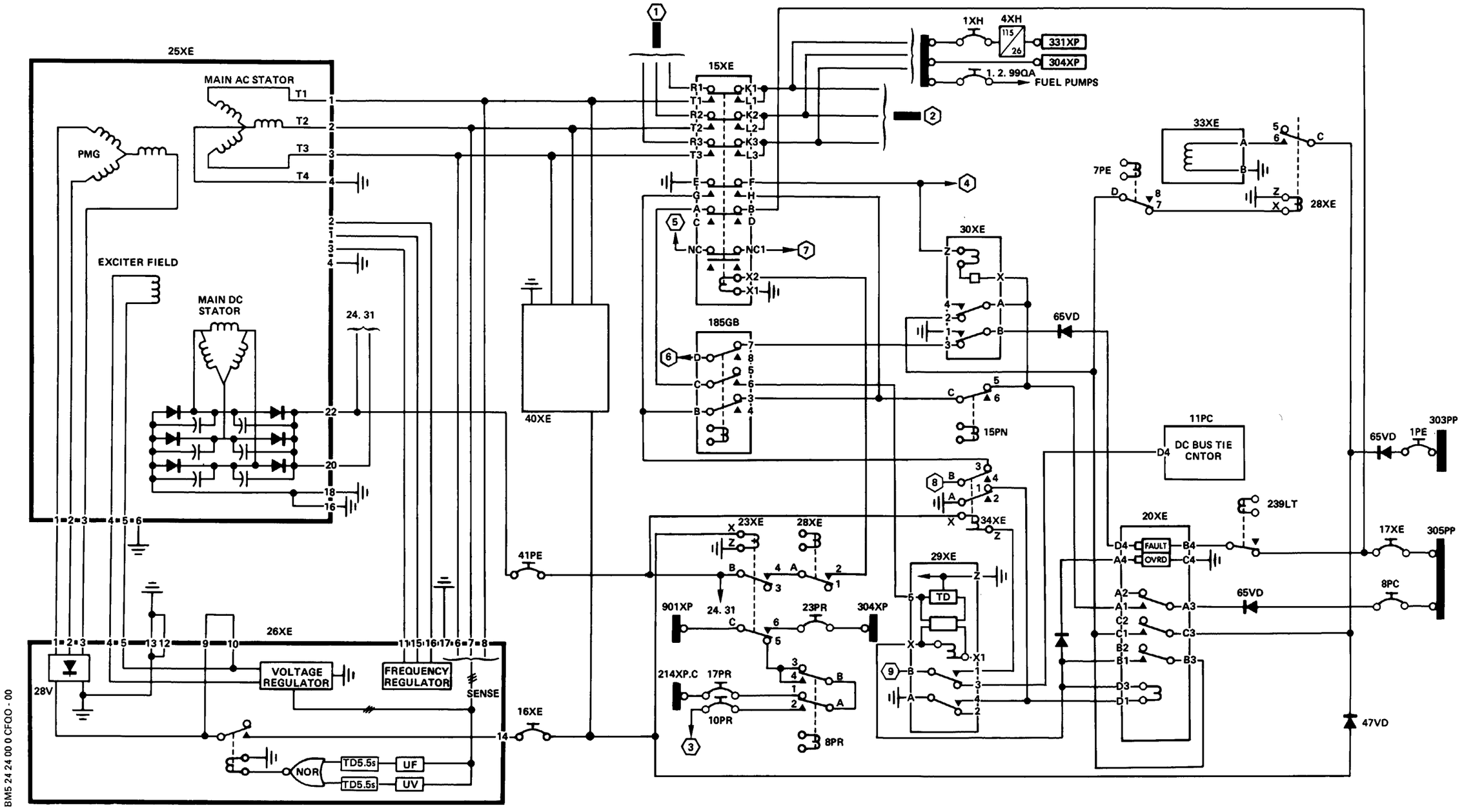
Emergency AC Generation - Control and Indicating Circuits - Sheet 1/2
Figure 006



Emergency AC Generation - Control and Indicating Circuits - Sheet 2/2
Figure 007



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Emergency AC Generation - Control and Indicating Circuits Sheet 2/2
Figure 008

supplied with 28VDC.
- in emergency configuration (supply by standby generator or static inverter) busbar 901XP is supplied.

4. Standby Generation

A. General
The standby generator delivers 115V/400 Hz, three-phase AC power and 50 A DC nominal power under 28V.
The emergency generation system comprises :
- a hydraulic motor driven by the Green hydraulic system which drives the standby generator
- an electric generator driven at constant speed and coupled to the hydraulic motor
- a generator control unit : GCU, protected from voltage subtransients and induced overvoltages due to lightning strike, by a lightning protection unit.

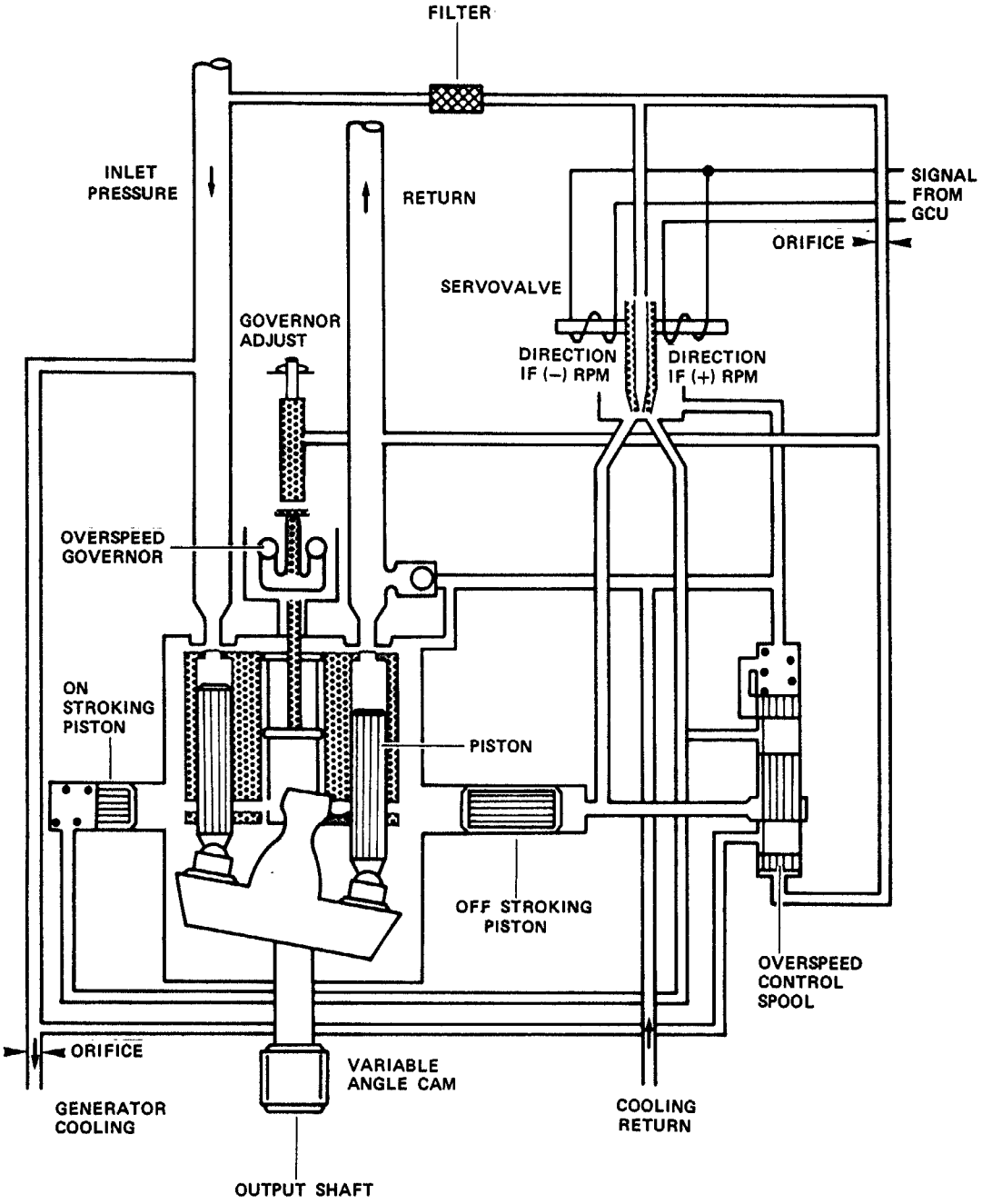
B. General Operating Principle
(1)Hydraulic motor (Ref. Fig. 009)
The hydraulic motor is driven by the Green hydraulic system when the associated solenoid valve opens.
The hydraulic motor incorporates a servovalve electrically controlled by the GCU. The servovalve serves to increase or decrease the motor RPM.
The motor also comprises an overspeed governor which intervenes in the event of failure of the servovalve to limit the RPM and frequency.
The main characteristics of the hydraulic motor are as follows :

- hydraulic fluid (type)	phosphate ester
- rotation	clockwise
- inlet pressure (normal range)	130/206 bars
- maximum hydraulic fluid temperature	99°C
- output speed (generator drive) :	12,000 RPM
- mechanical protection to limit output speed, in the event of servovalve failure, to	12,900 RPM

(2)Electrical generator (Ref. Fig. 010)
The electrical generator, which is driven at constant speed (12,000 RPM) is a conventional brushless generator with 3 coaxial units :
- PMG,
- rotating diode pilot exciter,
- main generator.

(a)PMG
The PMG comprises :
- an 8 pole permanent magnet inductor mounted on the rotor ;
- and a wye-connected three-phase ungrounded armature mounted on the stator.

As soon as the generator starts to run, it delivers the electrical power required for :
- energizing the main generator,
- supplying the GCU and various external contactors and relays, thus



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Emergency Generation - Standby Generator Hydraulic Motor
Figure 009

making the system electrically independent.

(b)Pilot exciter

This comprises :

- a 10 pole inductor mounted on the stator,
- a wye connected 3 phase armature mounted on the rotor,
- a rectifier bridge made up of 3 (rotating) power diodes.

Its excitation which is directly controlled by the GCU, enables DC current to be supplied to the main generator inductor via its armature and the rectifier bridge.

(c)Main generator

This comprises :

- a 4 pole inductor mounted on the rotor and supplied by the pilot exciter ;
- 2 power armatures mounted on the stator :
  . one is a wye connected three-phase armature with its neutral lead connected to the aircraft structure : it can supply a nominal three phase power of 5KVA under 115 volts ;
  . the other is a delta connected three phase armature connected to a rectifier bridge made up of 6 diodes : this assembly can supply a nominal DC current of 50 amps under a 24 to 30VDC voltage.

(d)Main characteristics

AC power :	
- 3 phases	
- nominal power at point of regulation	5 KVA
- nominal current	14.5 A
- nominal voltage between phase and neutral at point of regulation (voltage regulated by the GCU)	115 ± 1.5 V
- frequency	400 Hz at 12,000 RPM
- overload :	
7.5KVA	2 min.
10KVA	5 sec.
DC power :	
- nominal power	50 A at 28 volts
- voltage (not regulated) at distribution busbars	24 to 30 volts
- overload	
100 A at 22 volt	1 sec.

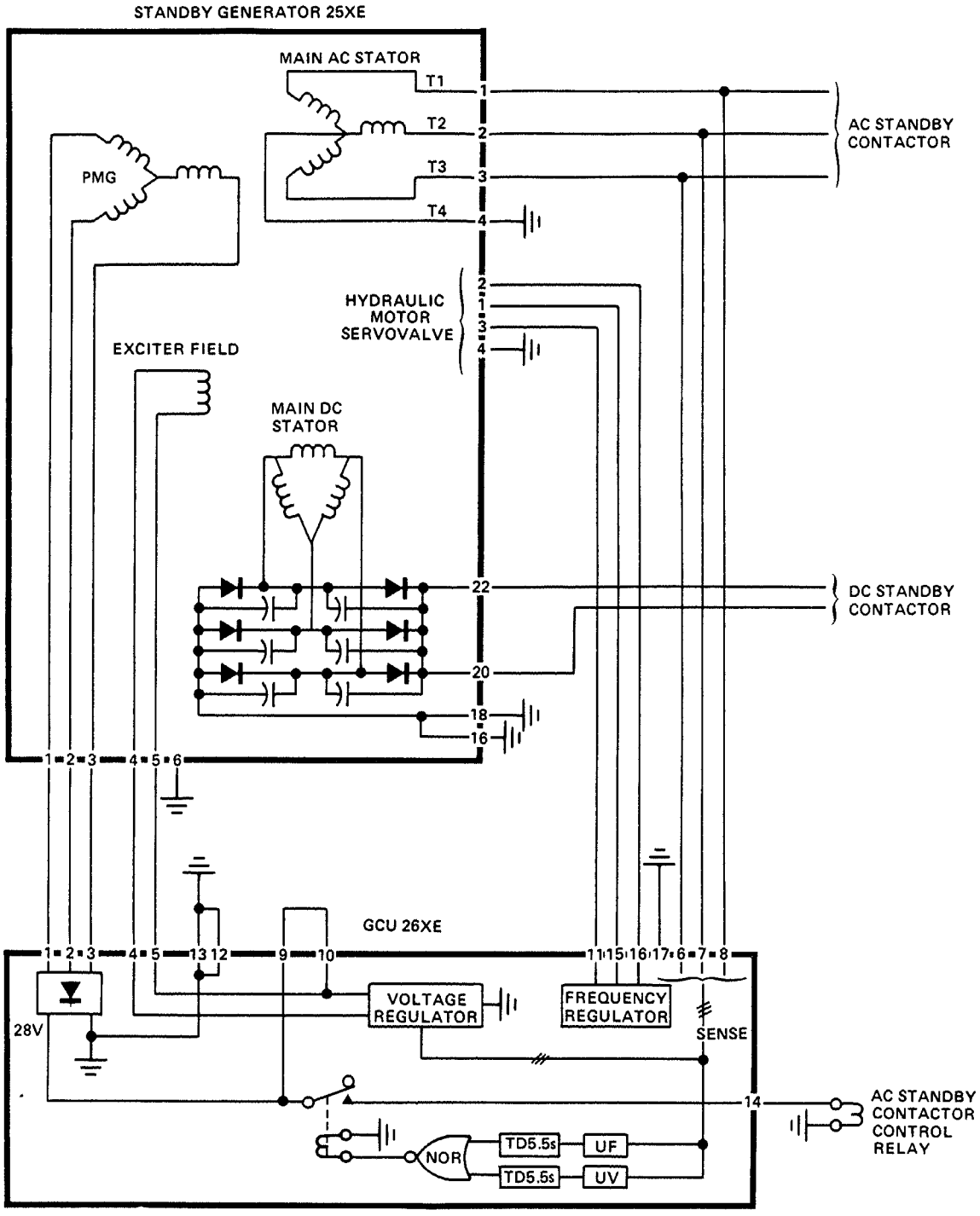
(3)GCU operating principle (Ref. Fig. 010)

The GCU provides 3 functions :

- frequency regulation,
- AC voltage regulation,
- generator control and protection functions.

(a)Frequency regulation

The GCU controls the CSM/G hydraulic motor servovalve to increase or reduce frequency according to whether the corresponding generator RPM (the generator is driven by the hydraulic motor) is less or greater than 12,000 RPM, which corresponds to 400 Hz.



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Emergency Generation - Standby Generator and GCU
Figure 010

(b)AC voltage regulation
This regulation is performed on the basis of the phase-neutral voltages picked off at the point of regulation. The GCU compares these voltages with a reference voltage and increases or reduces the average value of the generator pilot exciter current according to whether the arithmetic mean of the voltages picked off at the POR is lower or higher than 115 volts. This excitation current regulation is provided by a transistor system (pulse width modulation).

(c)Generator control and protection functions
The GCU controls :
- generator excitation via a transistorized system
- the control relay of the generator AC line contactor via a relay in the GCU called the PR relay (Power Ready Relay).

The GCU permanently monitors the frequency and voltage of the 3 phases at the POR and when an under-frequency (360 ± 5 Hz/5.5 ± 0.5 s) or undervoltage (100 ± 4 V/5.5 ± 0.5 s) fault is detected, it causes :
- de-energization of the generator,
- de-energization of the PR relay, which de-energizes control relay and thus AC line contactor.

In addition, when AC line contactor opens, DC line contactor opens.

(4)Hydraulic system
(Ref. Fig. 011)
The Green hydraulic system supplies hydraulic fluid to the hydraulic motor via a solenoid valve.
A part of the fluid also lubricates the electrical generator.

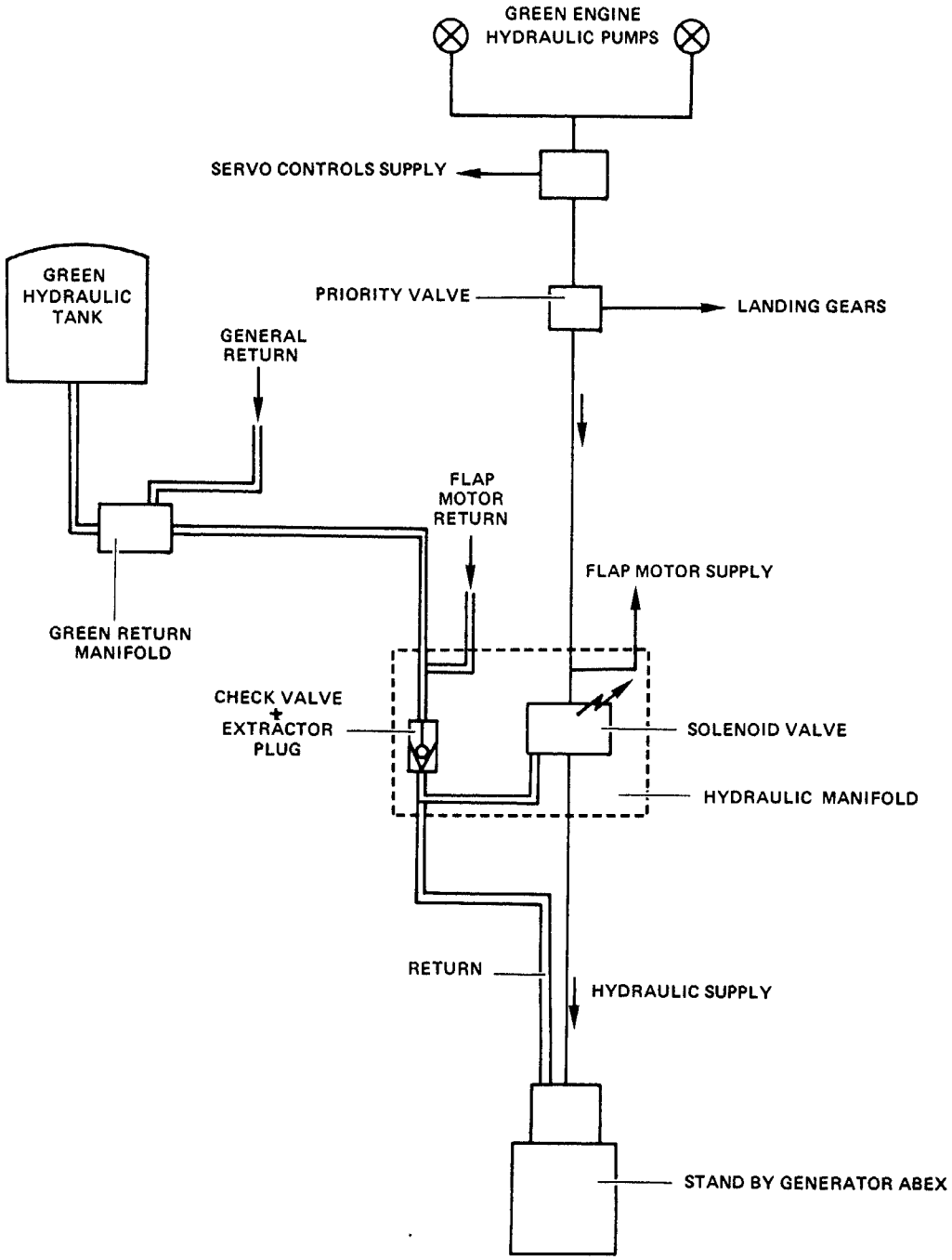
5. Selector Valve (Ref. Fig. 012)

R The selector valve is located in the hydraulics compartment.
The selector valve is of the 3-way type and isolates the standby generation system when the solenoid is de-energized. An internal valve ensures progressive opening of the selector valve supply-to-delivery passage.

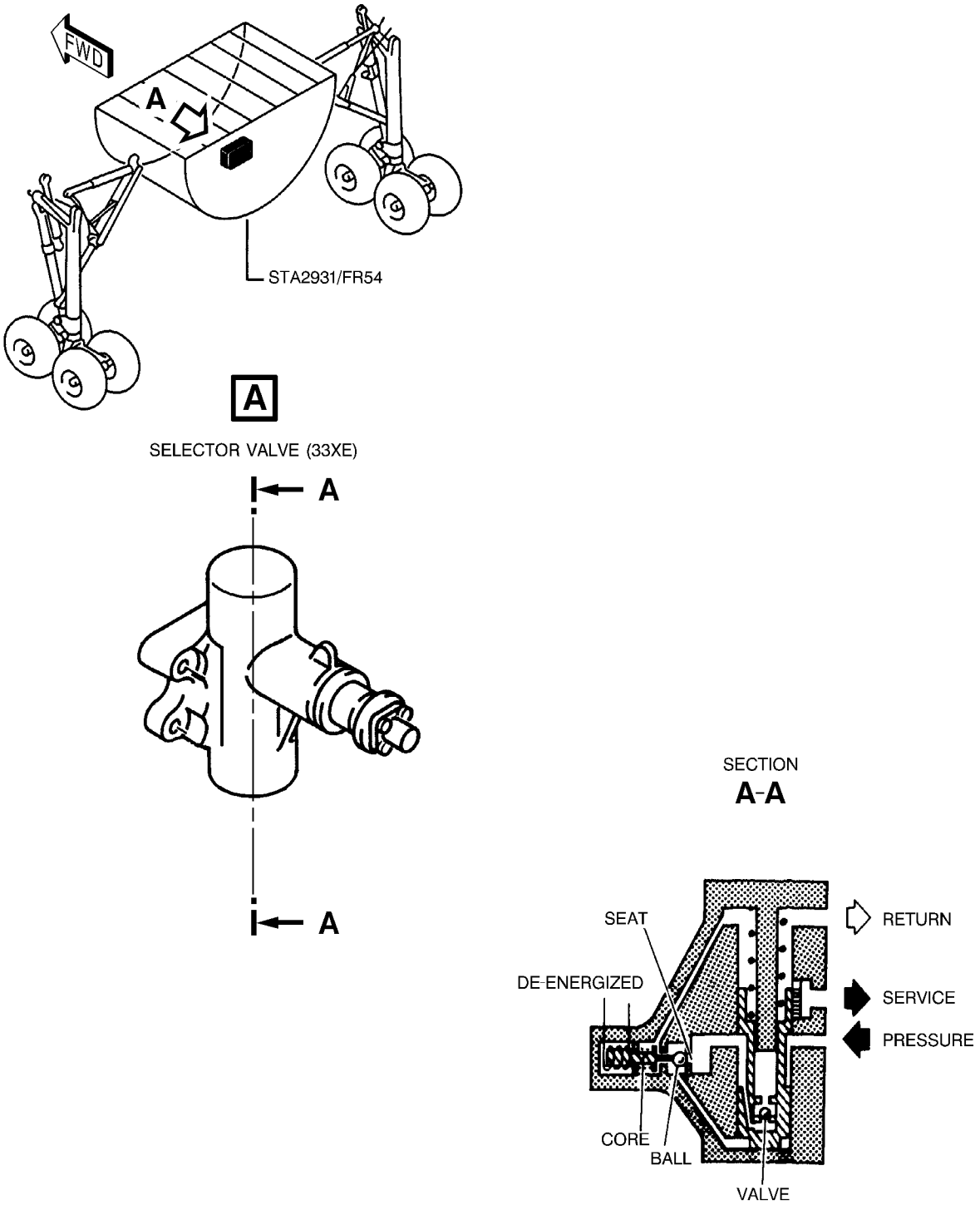
R 6. Static Inverter (Ref. Fig. 013)

A. General
The static inverter enables 115/400 Hz monophase alternating current to be supplied from 28 VDC supply.
It mainly consists in :
- a power assembly which chops the supply direct current voltage and adapts the obtained voltage by means of an output transformer
- a control assembly for the chopping by pulse width modulation
- a control assembly for the starting and monitoring of its supply voltage.

B. General Operating Principle
(1)Power assembly
It consists of a transformer associated with two switches (power transistors) push-pull mounted. Constant amplitude pulses, the width of which varies according to a sine law, are applied by the switches to the transformer. A low-pass filter connected to the secondary coil of the



Emergency Generation - Hydraulic System
Figure 011



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Emergency AC Generation - Selector Valve (33XE)
Figure 012

transformer enables an AC sine wave signal to be obtained.

(2)Chopping control

This control is generated from :

- an alternating signal "a" representative of :
  . the static inverter output voltage
  . and the 400 Hz sine wave reference signal
- a high frequency (10 kHz) triangular wave signal, "b".

The comparison of these two signals (Ref. Fig. 013) enables the control of the power switches.

The relative amplitude of the two signals regulates the output voltage.

NOTES : - An alternating current information of the static inverter output enables the limitation of the current supplied in case of short circuit.
- The chopping control depends also on the starting control and static inverter input voltage monitoring.

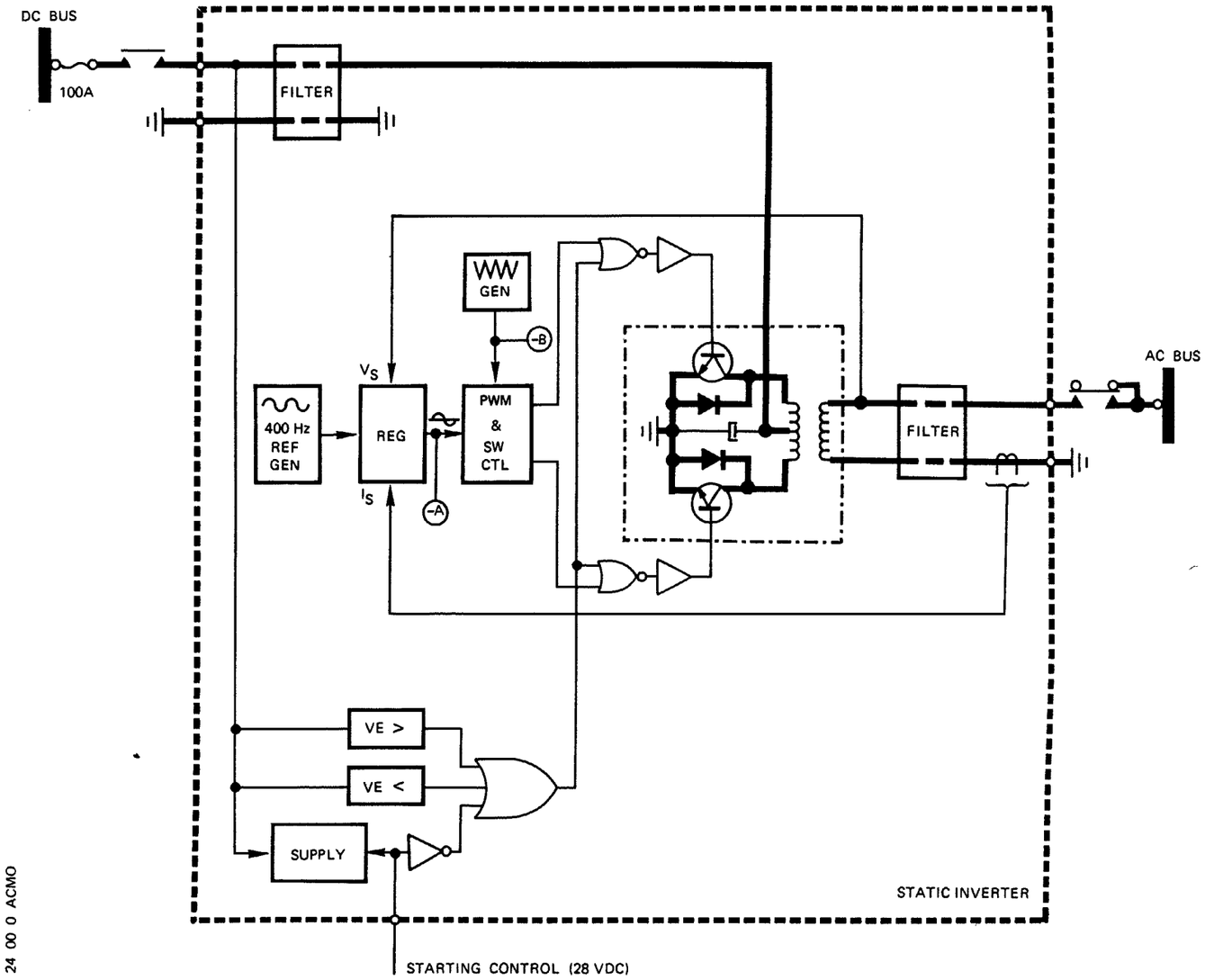
(3)Starting control and monitoring of the static inverter supply voltage

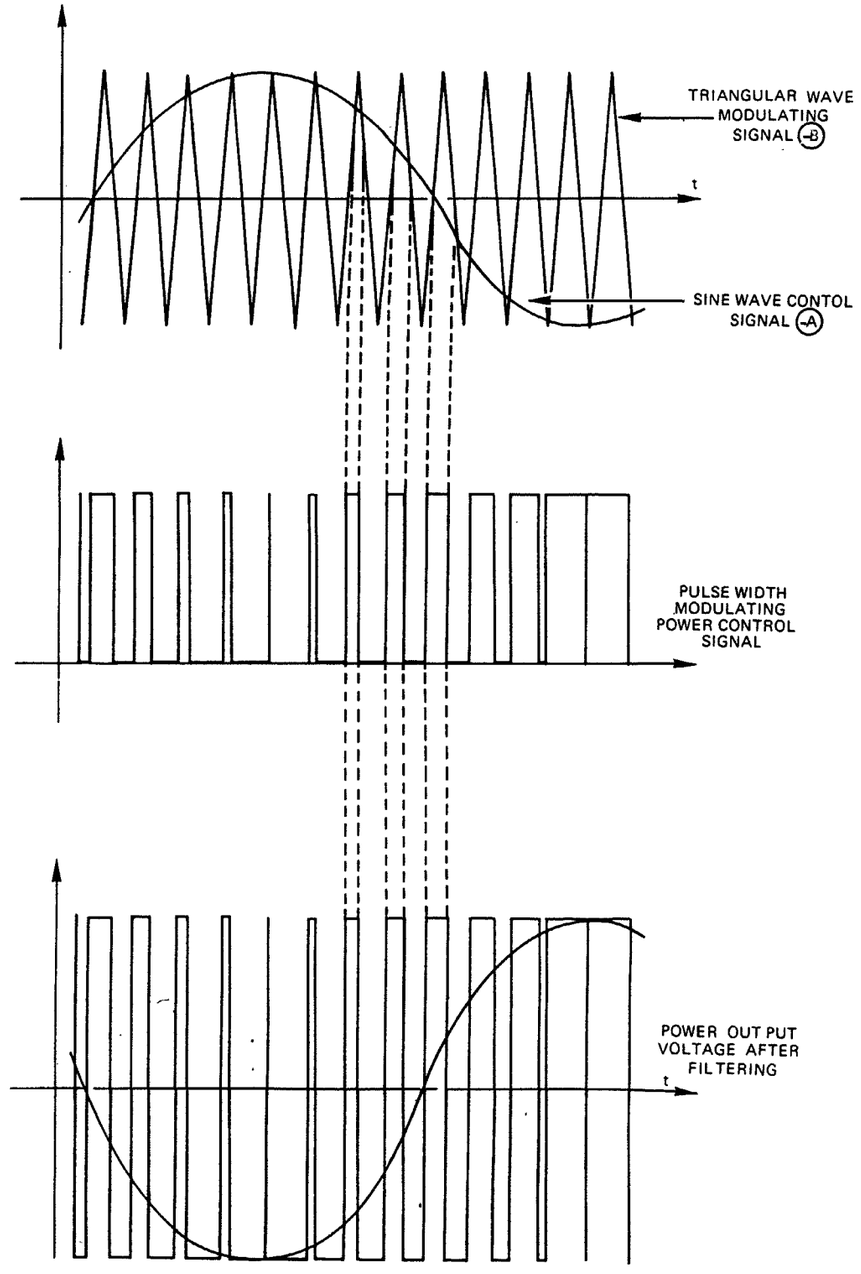
Starting of the static inverter occurs upon reception of an external signal which authorizes :

- its general supply
- and the power chopping.
- A monitoring facility for the direct current supply voltage prevents the chopping when the voltage is not within the permissible limits (over/undervoltage).

C. General Characteristics

- References : AEROSPATIALE CSM 1204
- Input voltage : VI = - between 20 and 28VDC normal
  - between 17 and 32VDC abnormal
- Output voltage : VO = 115V ± 3%
- Frequency : f = 400 ± 4 Hz
- Nominal power : 1000 VA for cos Phi from 1 to 0.7
- Overload : - 1320VA : 30 mn
  - 1600VA : 10 sec.
- Short circuit capacity : 2 In (22A) for 1mn and VI = between 17 and 31V
- Efficiency ≥ 0.8 for P = 1000VA, cos Phi = 0.7 and VI between 20 and 31V
- Cooling by natural convection
- Protections
  . overvoltage : VI ≥ 43/46 VDC
  . undervoltage : VI ≤ 12/15 VDC
  . against supply polarity inversions, when this internal protection is associated to a 100A fuse
- Starting time : 50ms.




TRIANGULAR WAVE MODULATING SIGNAL -B
t
SINE WAVE CONTOL SIGNAL -A
PULSE WIDTH MODULATING POWER CONTROL SIGNAL
POWER OUT PUT VOLTAGE AFTER FILTERING
t

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Static Inverter
Figure 013

1. Test of Static Inverter

A. Operational Test
(1)Reason for the job
Cursory check of the static inverter for correct operation.
(2)Procedure
(a)Job set-up
Do not supply the aircraft electrical network.
(b)Test

ACTION	RESULT
1. On panel 424VU - press the three **BAT** pushbutton switches.	On panel 424VU - the flowbars of the three **BAT** pushbutton switches come on. - **AC EMER ON INV** indicator light and **DC ESS ON BAT** warning light come on. - **AC BUS 1 OFF, AC BUS 2 OFF** and **AC ESS BUS OFF** warning lights come on. - **DC NORM BUS OFF** warning light comes on. - On **GEN 1** and **GEN 2** pushbutton switches, **FAULT** or **OFF** legend comes on according to the position of these pushbutton switches.
2. On panel 425VU, **AC** section - place **AC** parameter selector switch in **BUS EMER** position.	On panel 425VU - check frequency and voltage displayed on indicators.
3. On panel 424VU - press and release the three **BAT** pushbutton switches.	On panel 424VU - the flowbars of the three **BAT** pushbutton switches go off. - all the annunciator lights go off.

B. Functional Test
(1)Reason for the Job
Check the automatic activation of the static inverter.
(2)Equipment and Materials

ITEM	DESIGNATION
R (a)	Snapwire
R (b)	Lead-seal
R (c)	Sealing Pliers

Referenced Procedure

ITEM	DESIGNATION
- 24-41-00, P. Block 301	AC External Power Control

R (3)Procedure

(a)Job set-up

1 Initial conditions

- correct electrical power supply.
- forward services ventilation system in operation.
- overhead panel circuit breakers closed and particularly those associated with ECAM.

2 On ECAM control panel

- using RIGHT DISPLAY knob adjust brightness on R ECAM display unit.
- press AC pushbutton switch : ELEC AC page appears on the R ECAM display unit.

(b)Test

ACTION	RESULT
1. On panel 425VU - place AC parameter selector switch in BUS ESS position.	On panel 425VU - the frequency meter indicates 400 Hz ± 4. - the voltmeter indicates 115 V ± 3.
2. On panel 424VU - open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend of OVRD SUPPLY 1 pushbutton switch comes on. - AC ESS BUS OFF warning light comes on. - AC EMER ON INV indicator light comes on. On panel 425VU - No indication on the frequency meter and voltmeter. Check that indications displayed on the R ECAM display unit correspond to those of ELEC PWR and ELEC IND overhead panels.
3. On panel 425VU - place AC parameter selector switch in BUS EMER position.	On panel 425VU - the frequency meter shows 400 Hz ± 4. - the voltmeter shows 115 V ± 3. On panel 424VU - No change. Check that indications displayed on the R ECAM display unit correspond to those of ELEC PWR and ELEC IND overhead panels.

ACTION	RESULT
4. On panel 424VU - open the safety guard and press and release out OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend of OVRD SUPPLY 1 pushbutton switch goes off. - all the annunciator lights go off. On panel 425VU - No change. Check that indications displayed on R ECAM display unit correspond to those of ELEC PWR and ELEC IND overhead panels.

(c)Close-up

R 1 On panel 424VU

R - Close OVRD SUPPLY pushbutton switch safety guard.

R - Install snapwire and lead-seal.

R 2 De-energize the aircraft electricalnetwork (Ref. 24-41-00, P. Block 301).

R 3 Restore system and aircraft to normal operating condition.

2. Functional Test of Electrical Standby Generating System

A. Test of Standby Generator Manual Starting

(1)Reason for the job

Check manual starting of standby generator.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

(3)Procedure

WARNING : MAKE CERTAIN THAT PROTECTIVE COVERS ARE REMOVED FROM PROBES.

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Make certain that electronics racks ventilation is correct.

3 Operate the two green hydraulic electric pumps by pressing ELEC PUMPS pushbutton switch on panel 427VU.

NOTE : On FUEL section of panel 430VU, make certain that fuel PUMP pushbutton switches are released (out) (OFF legend on). On panel 427VU, make certain that PTU pushbutton switches are released (out).

(b)Test

ACTION	RESULT
1. On panel 424VU - press STBY GEN pushbutton switch.	On panel 424VU - OVRD legend of SBTY GEN push-button switch comes on - AC EMER ON INV and DC ESS ON BAT warning lights are off. - flowbars of BAT pushbutton switches are off.
2. On panel 425VU - Place DC parameter selector switch in ESS TR position.	On panel 425VU - No indication on ammeter (ESS TR does not supply current to ESS BUS, which indicates that STBY GEN is coupled to the aircraft AC network).
3. On panel 425VU - Place DC parameter selector switch in ESS BUS position.	On panel 425VU - On voltmeter, voltage is comprised between 22 and 29 volts.
4. On panel 425VU - Place AC parameter selector switch in ESS BUS position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts - Frequency shown is between 390 and 410 Hz.
5. On panel 425VU - Place AC parameter selector switch in EMER BUS position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts.

NOTE : On ECAM display unit, ELEC DC page :
- DC BUS TIE is not displayed,
- DC ESS BUS is amber.

The test stops normally after 2 minutes by automatic release of STBY GEN pushbutton switch.

On panel 427VU, press and release ELEC PUMPS pushbutton switch.

(c)Close-up

1 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Restore system and aircraft to normal operating condition.

B. Test of Standby Generator Automatic Starting

R NOTE : To do this test, you can also do procedure C. (with an engine
R driven pump). If procedures B. and C. are not possible, do
R procedure D. (with the Green system electric pumps).

(1)Reason for the job

Check automatic starting of standby generator.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-10-00, P. Block 301	Main Hydraulic Power
- 12-11-28, P. Block 301	Fuel

(3)Procedure

WARNING : MAKE CERTAIN THAT PROTECTIVE COVERS ARE REMOVED FROM PROBES.

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Make certain that eletronics rack ventilation is correct.

3 Pressurize the Green hydraulic system by means of hydraulic ground power unit (Ref. 29-10-00, P. Block 301).

4 On PROBE HEAT section of panel 433VU, release CAPT, F/O and STBY push-button switches.
- OFF legends on pushbutton switches are on.
- all legends on CAPT, F/O and STBY annunciators are on.

5 Check on FUEL QTY indicator, on FUEL section of panel 430VU, that the LH inner tank, the center tank and the RH inner tank should contains at least 500kg of fuel.
Replenish the tanks if necessary (Ref. 12-11-28, P. Block 301).

(b)Test

ACTION	RESULT
On PROBE HEAT section of panel 433VU - press CAPT pushbutton switch	On PROBE HEAT section of panel 433VU - OFF legend on CAPT annunciator is OFF.
- release CAPT pushbutton switch.	- OFF legend on CAPT pushbutton switch comes on.
On panel 133VU, 332/U51, open circuit breaker 2GB	
On panel 133VU, 332/U78, open circuit breaker 16PC	
On panel 424VU - Press and release EXT PWR pushbutton switch.	On panel 424VU - AVAIL legend of EXT PWR pushbutton switch comes on - STBY generator starts - AC ESS BUS OFF, AC EMER ON INV, DC ESS ON BAT warning lights are off - AC BUS 1 OFF, AC BUS 2 OFF, DC NORM BUS OFF warning lights come on.

R

ACTION	RESULT
On panel 425VU - Place **AC** parameter selector switch in **ESS BUS** position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts - Frequency shown on frequency meter is between 390 and 410 Hz.
On panel 425VU - Place **AC** parameter selector switch in **EMER BUS** position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts.
On panel 425VU - Place **DC** parameter selector switch in **ESS BUS** position.	On panel 425VU - Voltage shown on voltmeter is between 22 and 29 volts.
On panel 424VU - Press **LAND RECOVERY** pushbutton switch.	On panel 424VU - **ON** legend of this pushbutton switch comes on - **DC ESS ON BAT** warning light comes on.
On panel 424VU - Press and release **LAND RECOVERY** pushbutton switch.	On panel 424VU - **ON** legend of this pushbutton switch goes off. - **DC ESS ON BAT** warning light goes off.
On panel 429VU - Place **APU MASTER** switch in **ON** position.	On panel 424VU - **DC ESS ON BAT** warning light comes on.
On panel 429VU - Place **APU MASTER** switch in **OFF** position.	On panel 424VU - **DC ESS ON BAT** warning light goes off.
On panel 430VU R - Press left inner tank pump 2 pushbutton switch. R R	- **FAULT** legend of left inner tank pump 2 pushbutton switch comes on momentarily then goes off.
On panel 430VU - Press and release left inner tank pump 2 pushbutton switch.	- **OFF** legend of left inner tank pump 2 pushbutton switch comes on.
On panel 430VU R - Press right inner tank pump 1 pushbutton switch. R R	- **FAULT** legend of right inner tank pump 1 pushbutton switch comes on momentarily then goes

ACTION	RESULT
R	off.
On panel 430VU R - Press and release right inner tank R pump 1 pushbutton switch. NOTE : The action on fuel pump pushbutton switches is used to eliminate a hidden failure of the AC standby contactor 15XE.	- OFF legend of right inner tank pump 1 pushbutton switch comes on.
On panel 133VU, 332/U51, close circuit breaker 2GB	
On panel 133VU, 332/U78, close circuit breaker 16PC	
On panel 424VU - press BAT OVRD pushbutton switch.	On panel 424VU - ON legend of BAT OVRD pushbutton switch comes on. Standby generator stops. - AC ESS BUS OFF, AC EMER ON INV, DC ESS ON BAT warning lights come on.
- press and release BAT OVRD pushbutton switch.	- ON legend of BAT OVRD pushbutton switch goes off.
On panel 424VU - press EXT PWR pushbutton switch	On panel 424VU - AC BUS 1 OFF, AC BUS 2 OFF, DC NORM BUS OFF warning lights go off. - AC ESS BUS OFF, AC EMER ON INV, DC ESS ON BAT warning lights go off.

(c)Close-up
1 Operate hydraulic ground power unit controls to shut down pressurization of Green hydraulic system (Ref. 29-10-00, P. Block 301).
2 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
3 Restore system and aircraft to normal operating condition.

**ON A/C 001-100,

C. Test of Standby Generator Automatic Starting
NOTE : To do this test, you can also do procedure B. (with a hydraulic

ground power unit). If procedures B. and C. are not possible, do procedure D. (with the Green system electric pumps).

(1)Reason for the job

Check automatic starting of standby generator by means of engine driven pump.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 501	Main Hydraulic Power
- 49-10-00, P. Block 501	Power Plant
- 12-11-28, P. Block 301	Fuel
- 71-00-00, P. Block 501	Power Plant - General

(3)Procedure

WARNING : MAKE CERTAIN THAT PROTECTIVE COVERS ARE REMOVED FROM PROBES.

(a)Job set-up

1 Check on FUEL QTY indicator, on FUEL section of panel 430VU, that the LH inner tank, the center tank and the RH inner tank contain at least 500kg of fuel.
Replenish the tanks if necessary (Ref. 12-11-28, P. Block 301).

2 Start the engine (Ref. 71-00-00, P. Block 501).

3 Make certain that electronics rack ventilation is correct.

4 On ELEC PWR panel 424VU, make certain that GEN 1 and 2 pushbutton switches are released (OFF legends are on).

5 Pressurize the Green hydraulic system by means of engine driven pump (Ref. 29-10-00, P. Block 501).

6 On PROBE HEAT section of panel 433VU, release CAPT, F/O and STBY push-button switches.
- OFF legends on pushbutton switches are on.
- all legends on CAPT, F/O and STBY annunciators are on.

(b)Test

ACTION	RESULT
On PROBE HEAT section of panel 433VU	On PROBE HEAT section of panel 433VU
- press CAPT pushbutton switch	- OFF legend on CAPT annunciator is OFF.
- release CAPT pushbutton switch.	- OFF legend on CAPT pushbutton switch comes on.

**ON A/C 101-200,

C. Test of Standby Generator Automatic Starting

NOTE : To do this test, you can also do procedure B. (with a hydraulic ground power unit). If procedures B. and C. are not possible, do procedure D. (with the Green system electric pumps).

(1)Reason for the job

Check automatic starting of standby generator by means of engine driven pump.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 29-10-00, P. Block 501	Main Hydraulic Power
- 49-10-00, P. Block 501	Power Plant
- 12-11-28, P. Block 301	Fuel
- 71-00-00, P. Block 201	Power Plant - General

(3)Procedure

WARNING : MAKE CERTAIN THAT PROTECTIVE COVERS ARE REMOVED FROM PROBES.

(a)Job set-up

1 Check on FUEL QTY indicator, on FUEL section of panel 430VU, that the LH inner tank, the center tank and the RH inner tank contain at least 500kg of fuel.
Replenish the tanks if necessary (Ref. 12-11-28, P. Block 301).

2 Start the engine (Ref. 71-00-00, P. Block 201).

3 Make certain that electronics rack ventilation is correct.

4 On ELEC PWR panel 424VU, make certain that GEN 1 and 2 pushbutton switches are released (OFF legends are on).

5 Pressurize the Green hydraulic system by means of engine driven pump (Ref. 29-10-00, P. Block 501).

6 On PROBE HEAT section of panel 433VU, release CAPT, F/O and STBY push-button switches.
- OFF legends on pushbutton switches are on.
- all legends on CAPT, F/O and STBY annunciators are on.

(b)Test

ACTION	RESULT
On PROBE HEAT section of panel 433VU - press CAPT pushbutton switch	On PROBE HEAT section of panel 433VU - OFF legend on CAPT annunciator is OFF.
- release CAPT pushbutton switch.	- OFF legend on CAPT pushbutton switch comes on.
**ON A/C ALL	
On panel 133VU, 332/U51, open circuit breaker 2GB	
On panel 133VU, 332/U78, open circuit breaker 16PC	
On panel 429VU - Place APU MASTER switch in OFF position.	On panel 424VU - STBY generator starts - AC ESS BUS OFF, AC EMER ON INV,

ACTION	RESULT
	DC ESS ON BAT warning lights are off - AC BUS 1 OFF, AC BUS 2 OFF, DC NORM BUS OFF warning lights come on.
On panel 425VU - Place AC parameter selector switch in ESS BUS position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts - Frequency shown on frequency meter is between 390 and 410 Hz.
On panel 425VU - Place AC parameter selector switch in EMER BUS position.	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts.
On panel 425VU - Place DC parameter selector switch in ESS BUS position.	On panel 425VU - Voltage shown on voltmeter is between 22 and 29 volts.
On panel 424VU - Press LAND RECOVERY pushbutton switch.	On panel 424VU - ON legend of this pushbutton switch comes on - DC ESS ON BAT warning light comes on.
On panel 424VU - Press and release LAND RECOVERY pushbutton switch.	On panel 424VU - ON legend of this pushbutton switch goes off. - DC ESS ON BAT warning light goes off.
On panel 429VU - Place APU MASTER switch in ON position.	On panel 424VU - DC ESS ON BAT warning light comes on.
On panel 429VU - Place APU MASTER switch in OFF position.	On panel 424VU - DC ESS ON BAT warning light goes off.
On panel 430VU R - Press left inner tank pump 2 pushbutton switch. R	- FAULT legend of left inner tank pump 2 pushbutton switch comes on momentarily then goes off.
R On panel 430VU	

ACTION	RESULT
- Press and release left inner tank pump 2 pushbutton switch.	- OFF legend of left inner tank pump 2 pushbutton switch comes on.
On panel 430VU R - Press and right inner tank pump 1 R pushbutton switch. R R	- FAULT legend of right inner tank pump 1 pushbutton switch comes on momentarily then goes off.
On panel 430VU R - Press and release right inner tank R pump 1 pushbutton switch. R	- OFF legend on right inner tank pump 1 pushbutton switch comes on.
NOTE : The action on fuel pump pushbutton switches used to eliminate a is hidden failure of the AC standby contactor 15XE.	
On panel 133VU, 332/U51, close circuit breaker 2GB	
On panel 133VU, 332/U78, close circuit breaker 16PC	
**ON A/C 001-100,	
On panel 424VU - press BAT OVRD pushbutton switch.	On panel 424VU - ON legend of BAT OVRD pushbutton switch comes on. Standby generator stops. - AC ESS BUS OFF, AC EMER ON INV, DC ESS ON BAT warning lights come on.
- press and release BAT OVRD pushbutton switch.	- ON legend of BAT OVRD pushbutton switch goes off.

(c)Close-up
1 Stop the engine (Ref. 71-00-00, P. Block 501).
2 Restore system and aircraft to normal operating condition.

**ON A/C 101-200,

ACTION	RESULT
On panel 424VU - press **BAT OVRD** pushbutton switch.	On panel 424VU - **ON** legend of **BAT OVRD** pushbutton switch comes on. Standby generator stops. - **AC ESS BUS OFF, AC EMER ON INV, DC ESS ON BAT** warning lights come on.
- press and release **BAT OVRD** pushbutton switch.	- **ON** legend of **BAT OVRD** pushbutton switch goes off.

(c)Close-up
1 Stop the engine (Ref. 71-00-00, P. Block 201).
2 Restore system and aircraft to normal operating condition.

**ON A/C ALL

D. Test of Standby Generator Automatic Starting
NOTE : Do this procedure (with the Green system electric pumps) only if you cannot do procedure B. (with a hydraulic ground power unit) or procedure C. (with an engine driven pump).

(1)Reason for the job
Check automatic starting of standby generator by means of the green system electric pumps.

(2)Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 12-11-28, P. Block 301	Fuel
- 24-41-00, P. Block 301	External Power
- 29-21-00, P. Block 301	Pressurization of Green hydraulic system using electric pumps

(3)Procedure
WARNING : MAKE CERTAIN THAT PROTECTIVE COVERS ARE REMOVED FROM PROBES.
WARNING : MAKE SURE THAT THE TRAVEL RANGES OF THE FLIGHT CONTROLS ARE CLEAR.
MOVEMENT OF FLIGHT CONTROLS CAN CAUSE INJURY TO PERSONS AND/OR DAMAGE.

CAUTION : DO NOT OPERATE THE FLAPS AND SLATS WHEN ONE OR MORE "SERVO CTL" PUSHBUTTON SWITCHES ARE IN THE RELEASED POSITION ("OFF" LEGEND ON).
OPERATION OF THE FLAPS AND SLATS IN THIS CONFIGURATION CAN CAUSE JAMMING OF THE MECHANICAL TRANSMISSION.

CAUTION : MAKE CERTAIN THAT GREEN HYDRAULIC RESERVOIR IS PRESSURIZED IN ORDER TO AVOID CAVITATION OF ELECTRIC PUMPS DURING OPERATION.

(a)Job set-up

1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2 Check on FUEL QTY indicator, on FUEL section of panel 430VU, that the LH inner tank, the center tank and the RH inner tank contain at least 500 kg of fuel.
Replenish the tanks if necessary (Ref. 12-11-28, P. Block 301).

3 On the upper center instrument panel 4VU, on the slats/flaps position indicator, make sure that the slats and flaps are in 0 position.

4 On the flight control panel 428VU, release the SERVO CTL/G pushbutton switch (the OFF legend comes on).

5 Make certain that electronics rack ventilation is correct.

6 On FUEL panel 430VU, press left INR TK PUMP 2, right INR TK PUMP 1 and L CTR TK PUMP pushbutton switches (the OFF legends go off).

7 Pressurize the Green hydraulic system using the electric pumps (Ref. 29-21-00, P. Block 301).

8 On PROBE HEAT section of panel 433VU, release CAPT, F/O and STBY push-button switches :
- OFF legends on pushbutton switches are on
- all legends on CAPT, F/O and STBY annunciators are on.

(b)Test

ACTION	RESULT
On panel 133VU, 332/U78, open circuit breaker 16PC	
On panel 133VU, 332/U51, open circuit breaker 2GB	
On panel 133VU, 332/U77, open circuit breaker 14PN	On panel 424VU - DC NORM BUS OFF warning light comes on.
On panel 132VU, 324/L83, open circuit breaker 198LT	
On panel 424VU, press OVRD SUPPLY 1 pushbutton switch	On panel 424VU - DC ESS ON BAT warning light comes on momentarily then goes off.

ACTION	RESULT
	On panel 430VU - FAULT legend of the left INR TK PUMP 2, right INR TK PUMP 1 and L CTR TK PUMP pushbutton switches comes on momentarily then goes off - Standby generator starts. On R ECAM display unit, ELEC DC page : - ESS BUS BAR becomes amber - ESS TR with no flow value.
On panel 425VU - place AC parameter selector switch in ESS BUS position	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts - Frequency shown on frequency meter is between 390 and 410 Hz.
On panel 425VU - place AC parameter selector switch in EMER BUS position	On panel 425VU - Voltage shown on voltmeter is between 110 and 122 volts.
On panel 425VU - place DC parameter selector switch in ESS BUS position	On panel 425VU - Voltage shown on voltmeter is between 22 and 29 volts.
On panel 424VU - press LAND RECOVERY pushbutton switch	On panel 424VU - ON legend of this pushbutton switch comes on - DC ESS ON BAT warning light comes on.
On panel 424VU - press and release LAND RECOVERY pushbutton switch	On panel 424VU - ON legend of this pushbutton switch goes off. - DC ESS ON BAT warning light goes off.
On panel 429VU - place APU MASTER switch in ON position	On panel 424VU - DC ESS ON BAT warning light comes on.
On panel 429VU - place APU MASTER switch in OFF position	On panel 424VU - DC ESS ON BAT warning light goes off.
On panel 424VU	

ACTION	RESULT
- push and release OVRD SUPPLY 1 pushbutton switch.	
On panel 132VU, 324/L83, close circuit breaker 198LT	
On panel 133VU, 332/U77, close circuit breaker 14PN	On panel 424VU : - Standby generator stops. On R ECAM display unit, ELEC DC page : - ESS BUS BAR becomes green - ESS TR with a flow value.
On panel 133VU, 332/U51, close circuit breaker 2GB	
On panel 133VU, 332/U78, close circuit breaker 16PC	

(c)Close-up

1 Depressurize the Green hydraulic system (Ref. 29-21-00, P. Block 301).
2 On FUEL panel 430VU, release left INR TK PUMP 2, right INR TK PUMP 1 and L CTR TK PUMP pushbutton switches (the OFF legends come on).
3 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
4 On the flight control panel 428VU, push the SERVO CTL/G pushbutton switch (the OFF legend goes off).
5 Restore system and aircraft to normal operating condition.

STATIC INVERTER - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notice
Referenced Procedure - 24-24-00, P. Block 501	Emergency AC Generation

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1) Open access door 144DR on refuel/defuel panel.

(2) On panel 110VU, check that PWR SUPPLY switch is in NORM position.

(3) Place a warning notice on panel 110VU prohibiting any operation during removal/installation procedure.

CAUTION : IT IS DANGEROUS TO ACTIVATE THE STATIC INVERTER DURING REMOVAL/INSTALLATION PROCEDURE.

(4) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/STAT INV/CTL	1XE	333/T79
133VU	ELEC/FUELLING SUPPLY/BAT 1	3PR	334/S80

B. Removal

(1) Loosen two locking screws (4).

(2) Lower screws (4) to free attachment lugs (7).

(3) Using handles (6), pull the unit out gently to disconnect connector (2) and free centering pins (1) on mount (3).

(4) Remove static inverter from mount (3).

(5) Remove protective grille from above static inverter.

C. Installation

(1) Install protective grille above static inverter.

(2) Place static inverter on mount (3).

(3) Slide static inverter along the mount until it engages with centering pins (1).

(4) Gently push the inverter up to the end of the mount until connector (2) engages.

(5) Install two locking screws (4) in attachment lugs (7).

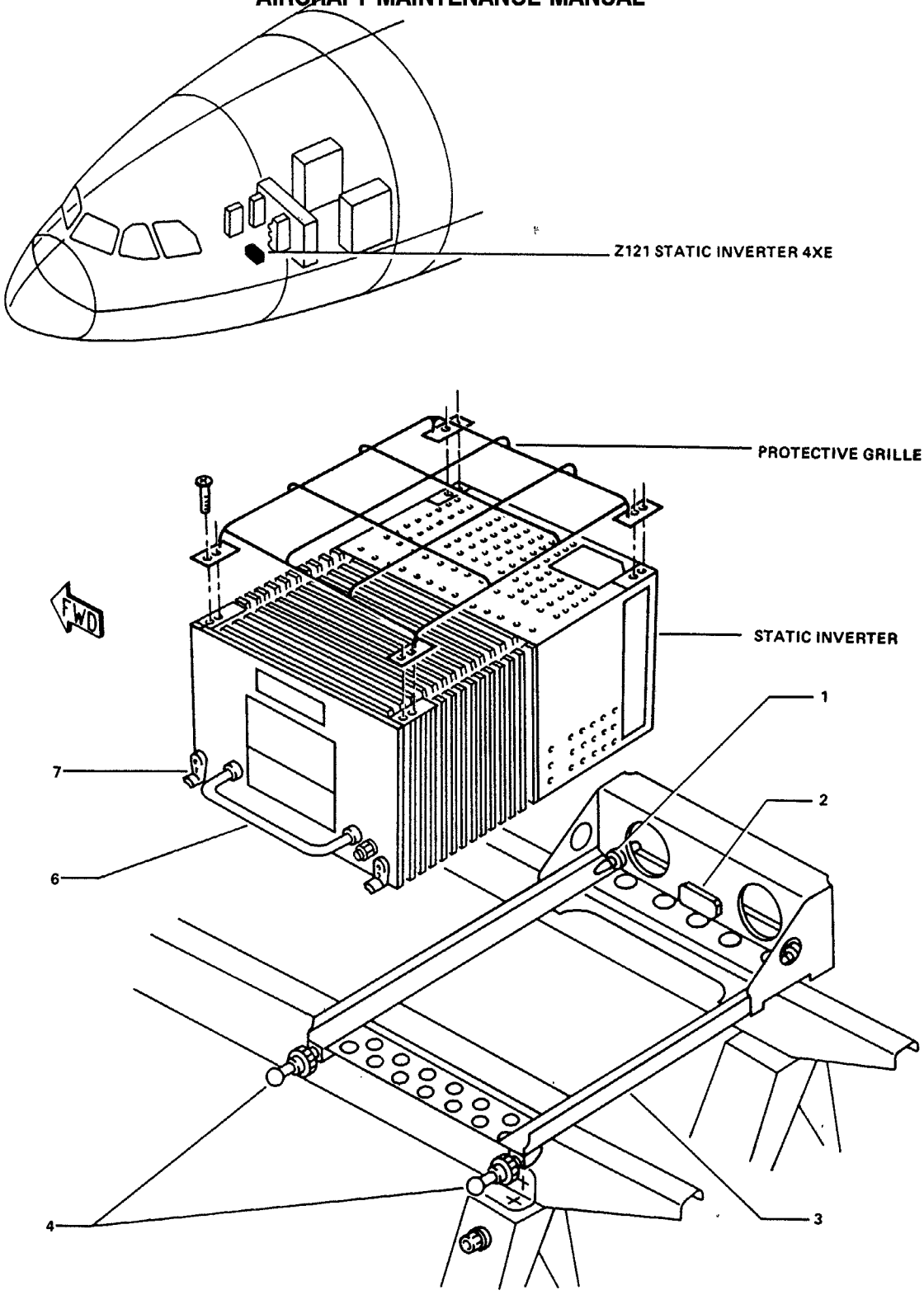
(6) Tighten two locking screws (4).

(7) Remove safety clips and tags and close circuit breakers 1XE and 3PR.

D. Test

Perform operational test of static inverter (Ref. 24-24-00, P. Block 501).

E. Close-Up



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Emergency AC Generator - Static Inverter
Figure 401

(1)Close access door 144DR.
(2)Remove warning notice from panel 110VU.
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

STANDBY GENERATOR - CONTROL UNIT - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Protective Cap
Referenced Procedure - 24-24-00, P. Block 501	Emergency AC Generation

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

(1) In flight compartment, on overhead panel 424VU, make certain that STBY GEN pushbutton switch is released.

(2) Install a warning notice on panel 424VU, prohibiting actuation of STBY GEN pushbutton switch.

(3) Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/DC TIE/CRT/SENSOR	8PC	333/T77
133VU	ELEC/STBY GEN/WARN	17XE	333/T83

B. Removal

(1) Disconnect and cap connector (3).

(2) Remove four screws (1) and washers (2).

(3) Remove GCU (4).

C. Installation

(1) Position GCU (4) on mount.

(2) Install four washers (2) and four screws (1) and tighten.

(3) Remove blanking cap and connect connector (3).

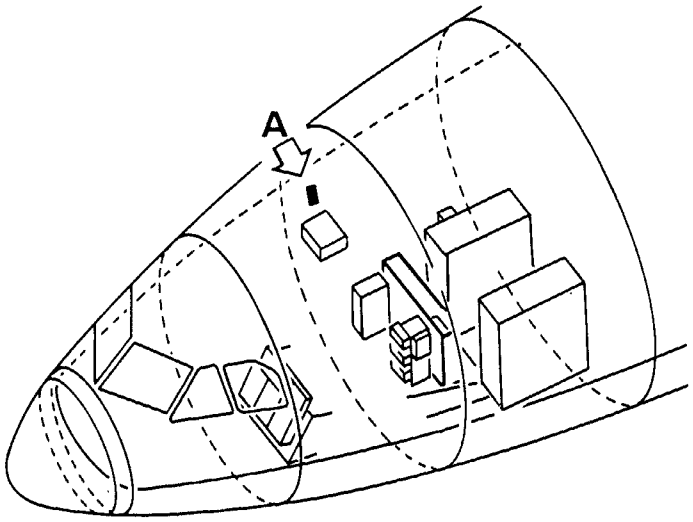
D. Close-Up

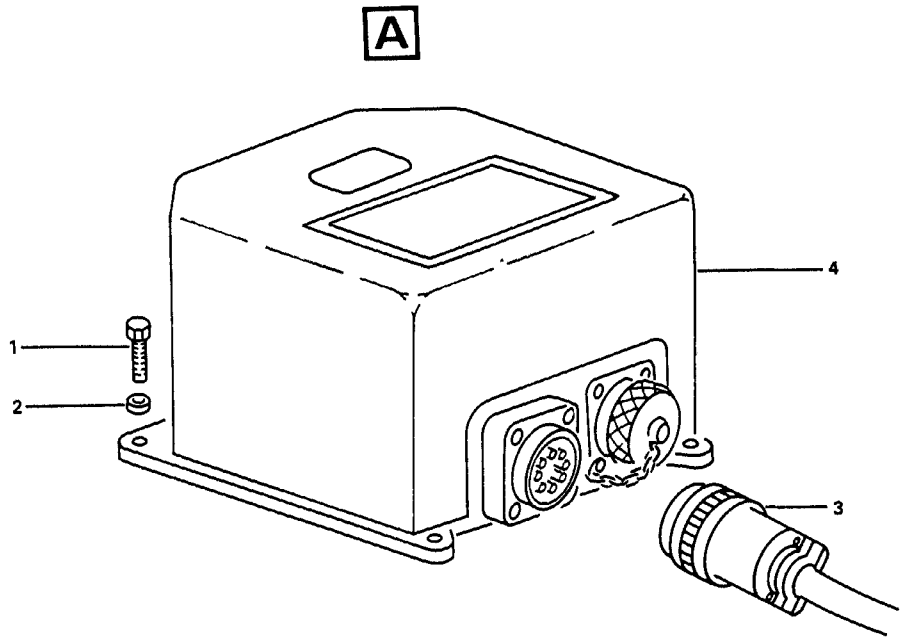
(1) Remove safety clips and tags and close circuit breakers 8PC and 17XE.

(2) In flight compartment, on overhead panel 424VU, remove warning notice.

E. Test

Make certain of the correct supply of the aircraft electrical network by standby generator (Ref. 24-24-00, P. Block 501).





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Standby Generator - Control Unit 26XE
Figure 401

STANDBY GENERATOR (25XE) REMOVAL/INSTALLATION

WARNING : CHECK THAT LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.
BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B.	Circuit Breaker Safety Clips
C.	Warning Notices
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 24-24-00, P. Block 501	Standby Generator

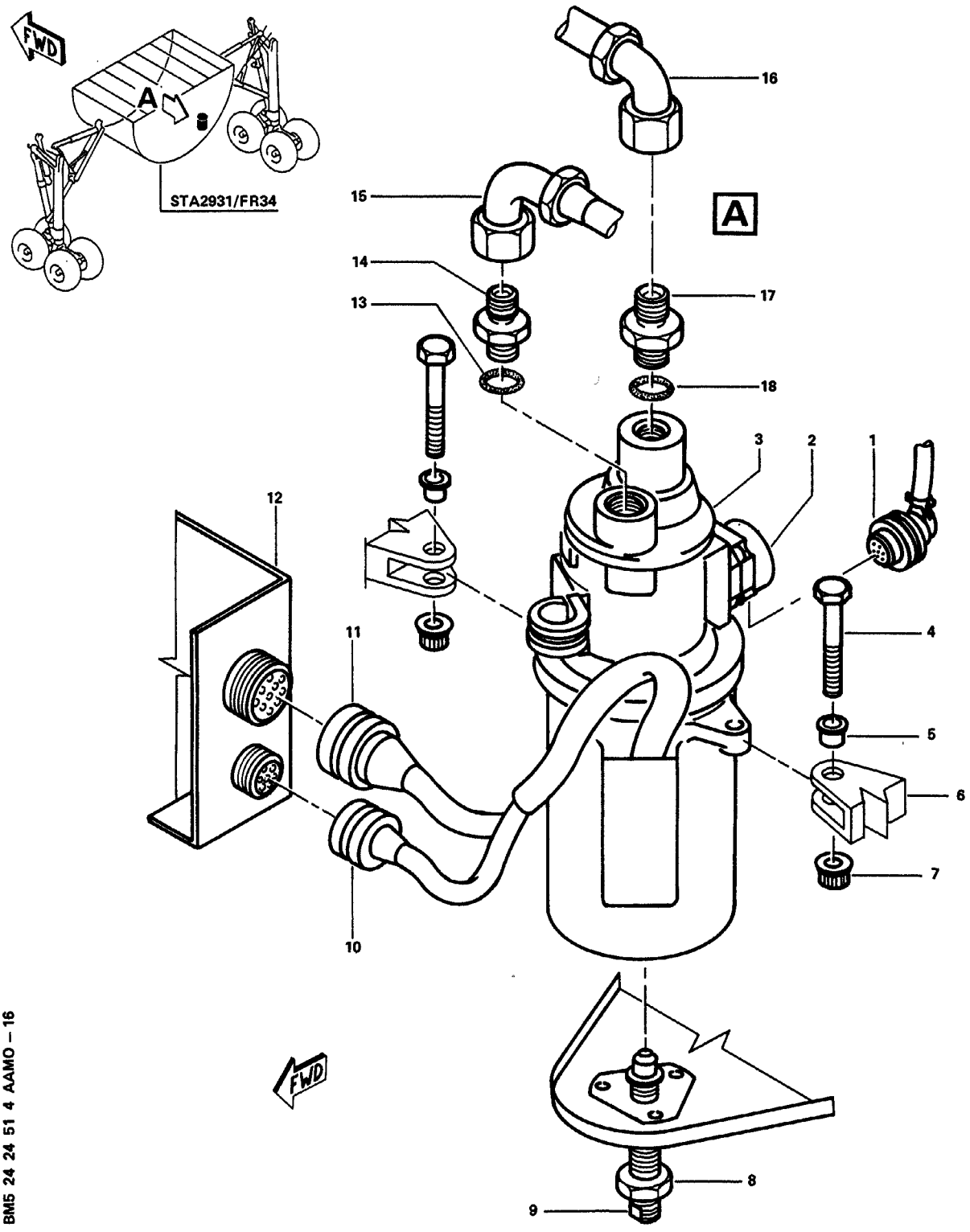
2. Procedure

A. Job Set-Up
(Ref. Fig. 401)
(1)On panel 427VU
- place a warning notice prohibiting operation of the Green system.
(2)Open, safety and tag the following circuit breakers

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/DC BUS/WARN &/ESS DC IND	7PC	206/D18
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51
133VU	ELEC/DC TIE/CRT/SENSOR	8PC	333/T77
133VU	ELEC/STBY GEN/WARN	17XE	333/T83

(3)Open access door 147AL to Green ground connector.
(4)Place a warning notice on ground connector prohibiting pressurization of Green system.
(5)Open main gear doors (Ref. 32-12-11, P. Block 301).
(6)Depressurize Green reservoir (Ref. 29-14-00, P. Block 301).
(7)Depressurize Green system (Ref. 29-10-00, P. Block 301).
(8)Install container below Standby Generator.

B. Removal



Standby Generator (25XE)
Figure 401

(1)Disconnect electrical connectors (10) and (11) from mounting bracket (12).
(2)Disconnect electrical connector (1) from servovalve (2).
(3)Disconnect inlet line (15) from union (14) and return line (16) from union (17).
(4)Cap open line ends.
(5)Remove unions (14) and (17).
(6)Discard O-rings (13) and (18).
(7)Loosen locknut (8), lower centering bolt (9).
(8)Remove nuts (7), bolts (4) and shouldered bushes (5).

C. Installation
(1)Install standby generator on fittings (6), with servovalve on wall side.
(2)Install shouldered bushes (5) and bolts (4) on fittings (6).
(3)Install nuts (7) ; do not tighten at this stage.
(4)Screw centering bolt (9) until it engages into stanby generator bore.
(5)Tighten nuts (7).
(6)Allow a 0.2 ± 0.15 mm (0.0078 ± 0.0059 in.) clearance between centering bolt (9) shoulder and standby generator base.
(7)Tighten locknut (8) to lock centering bolt (9).
NOTE : Make certain that clearance is 0.2 ± 0.15 mm (0.0078 ± 0.0059 in.).
(8)Install new O-rings (13) and (18).
(9)Install union (17) on standby generator (3) large orifice.
(10)Install union (14) on standby generator (3) small orifice.
(11)Remove blankings plugs/caps from lines (15) and (16).
(12)Connect return line (16) to union (17).
(13)Connect inlet line (15) to union (14).
(14)Connect electrical connector (1) to servovalve (2). Connect electrical connectors (10) and (11) to mounting bracket (12).

D. Tests
(1)Remove safety clips and tags and close circuit breakers 7PC, 1GE, 2GE, 4GE, 7GX, 8PC and 17XE.
R (2)Perform functional test of standby generator (Ref. 24-24-00, P. Block 501).
(3)Check for leakage at standby generator before and after test.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove hydraulic fluid container.
(3)Check fluid level in reservoir and top up as required (Ref. 12-12-29, P. Block 301).
(4)Close landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices and close access doors to ground connectors.

SELECTOR VALVE (33XE) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Container
B.	Circuit Breaker Safety Clips
C.	Warning Notices
D. Material No. 02-003	Hydraulic Fluids (Ref. 20-31-00)
Referenced Procedures	
- 12-12-29, P. Block 1	Hydraulic Reservoir Replenishing
- 24-24-00, P. Block 501	Emergency AC Generation
- 29-10-00, P. Block 301	Main Hydraulic Power - Pressurization/ Depressurization
- 29-14-00, P. Block 301	Hydraulic Reservoir Pressurizing System
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

2. Procedure

A. Job Set-Up (Ref. Fig. 401)
(1)On panel 427VU,
- place a warning notice prohibiting operation of Green system.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC-BAT PICK UP AND OVHD ANN	1PE	D22
101VU	HYD/PUMP	1GE	GEN1/B 8
101VU	HYD/PUMP	2GE	GEN2/B11
133VU	ELEC/PUMPS/WARN	4GE	331/V60
133VU	ACCU PRESS/CTL&/CARGO DOOR/PUMP	7GX	333/T51

(3)Open access door 147AL to Green ground connector.
(4)Place a warning notice on ground connector prohibiting pressurization of Green system.
(5)Open main gear doors (Ref. 32-12-11, P. Block 301).
(6)Depressurize Green reservoir. (Ref. 29-14-00, P. Block 301).
(7)Depressurize Green system (Ref. 29-10-00, P. Block 301).
(8)Install container below selector valve to be removed.

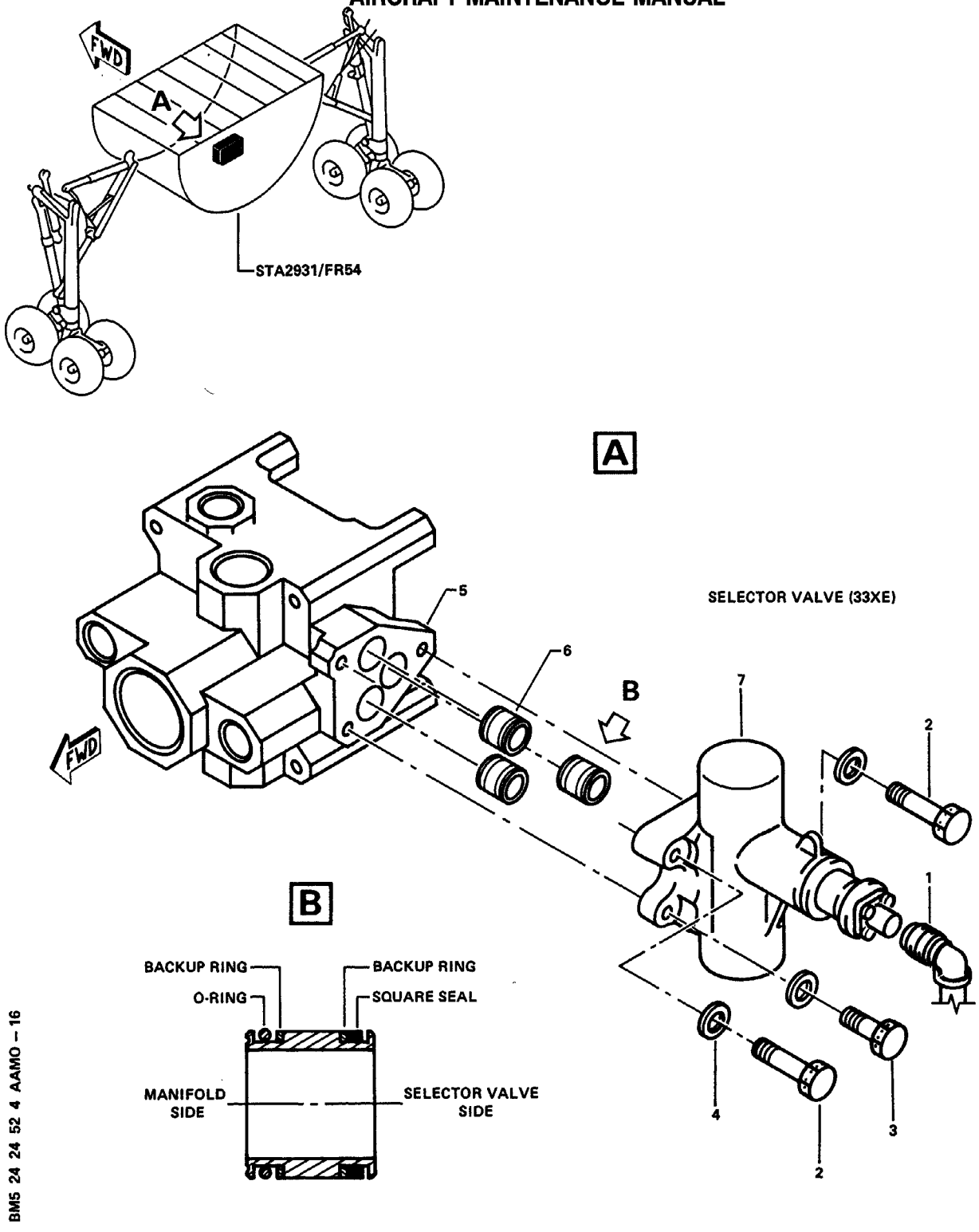
B. Removal
(1)Disconnect electrical connector (1).
(2)Cut and remove lockwire and remove the two long screws (2) and short screw (3). Retain the three washers (4).
(3)Remove selector valve (7) and the three bobbins (6).

C. Preparation of Replacement Component
CAUTION : THE GROOVED END OF BOBBINS IS TO BE INSERTED IN THE MANIFOLD PORTS.
(1)Fit the three bobbins (6) with new seals, lubricate with Material No. 02-003.
(2)Engage the three bobbins (6) into the ports of manifold (5).

D. Installation
(1)Position selector valve (7) on manifold (5).
(2)Install washers (4) and install the two long screws (2) and short screw (3) at respective locations.
(3)Tighten and wirelock screws.
(4)Connect electrical connector (1).

E. Tests
(1)Remove safety clips and tags and close circuit breakers.
(2)Perform operational test of standby generator (Ref. 24-24-00, P. Block 501).
(3)During and after test, check for hydraulic fluid leakage at selector valve.

F. Close-Up



Selector Valve (33XE)
Figure 401

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove container.
(3)Check fluid level in Green reservoir, and top up as required (Ref. 12-12-29, P. Block 1).
(4)Close landing gear doors (Ref. 32-12-11, P. Block 301).
(5)Remove warning notice and close access door to ground connector.

AC STANDBY CONTACTOR 15XE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
Referenced Procedure - 24-24-00, P. Block 501	Emergency AC Generation

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1)Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : THIS IS TO AVOID 115 VOLT ON CONTACTORS WHICH ARE UPSTREAM OF EXT PWR LINE CONTACTOR.

(2)Open access door 121BL.

(3)In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4)In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting APU start.

(5)In avionics compartment, remove GEN1, GEN2 doors from of AC power center 101VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1)Remove nuts (3) and remove power connections.

(2)Remove the four screws (2) and washers (1).

(3)Retain contactor (4).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1)Position contactor (4) and secure with the four screws (2) and washers (1).

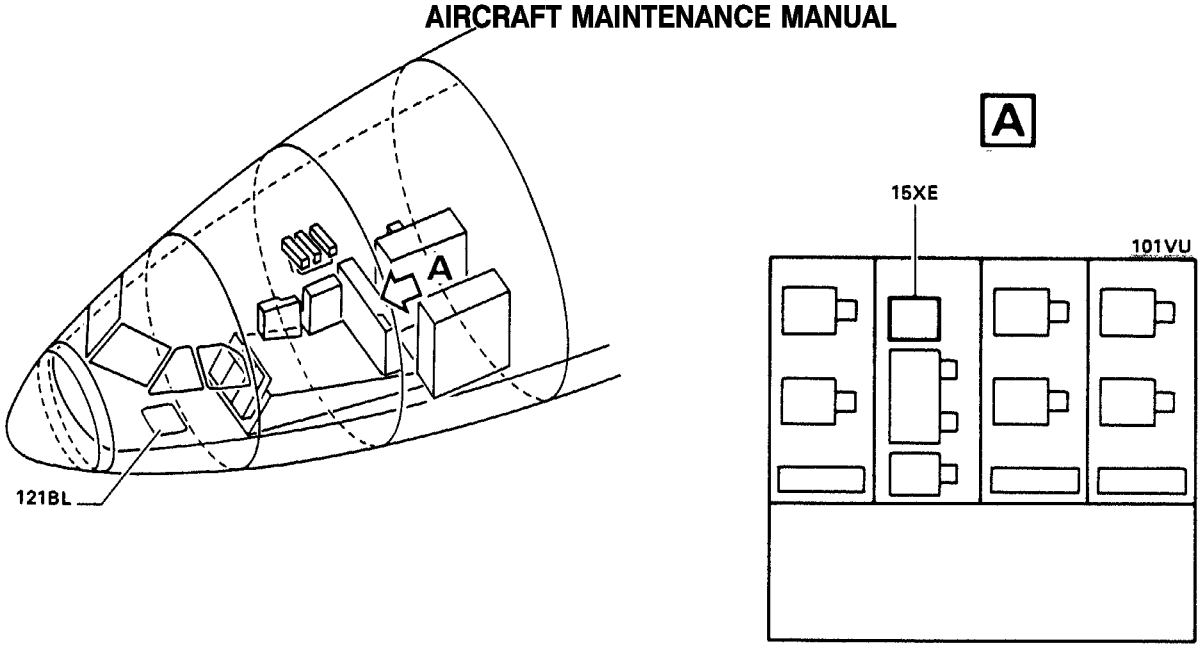
(2)Secure the various power connections with nuts (3).

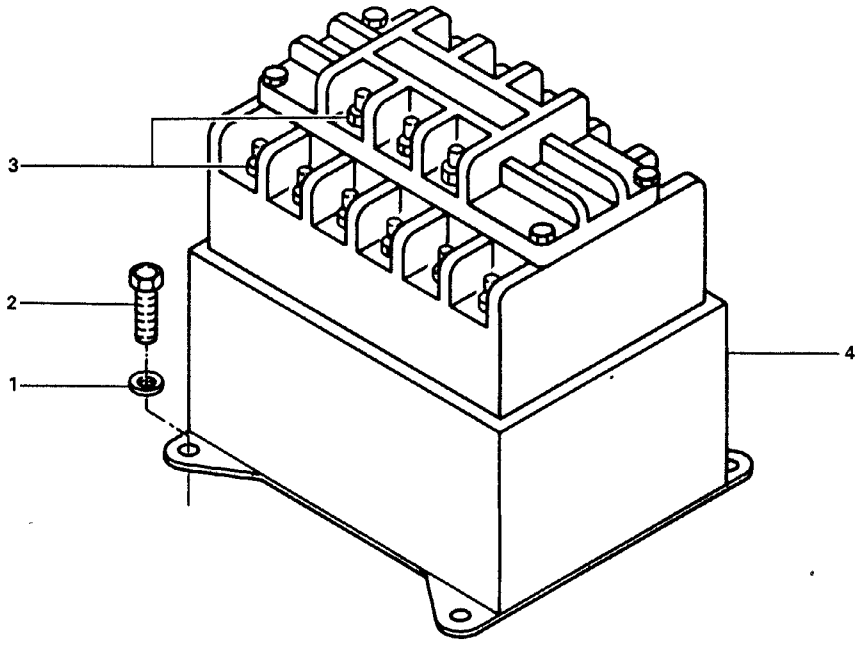
(3)TORQUE nuts (3) to between 0.26 and 0.29 m.daN (23 and 25.6 lbf.in.).

D. Test

R Perform functional test of electrical standby generating system
R (Ref. 24-24-00, P. Block 501).

E. Close-Up





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AC Standby Contactor 15XE
Figure 401

(1)Install door on AC power center 101VU.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panel 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

1. General

These circuits control the supply of the essential distribution network and transformer rectifier, together with that of the major part of the AC and DC power distribution.

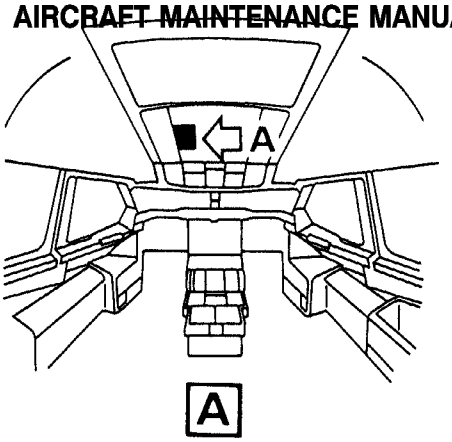
They enable :

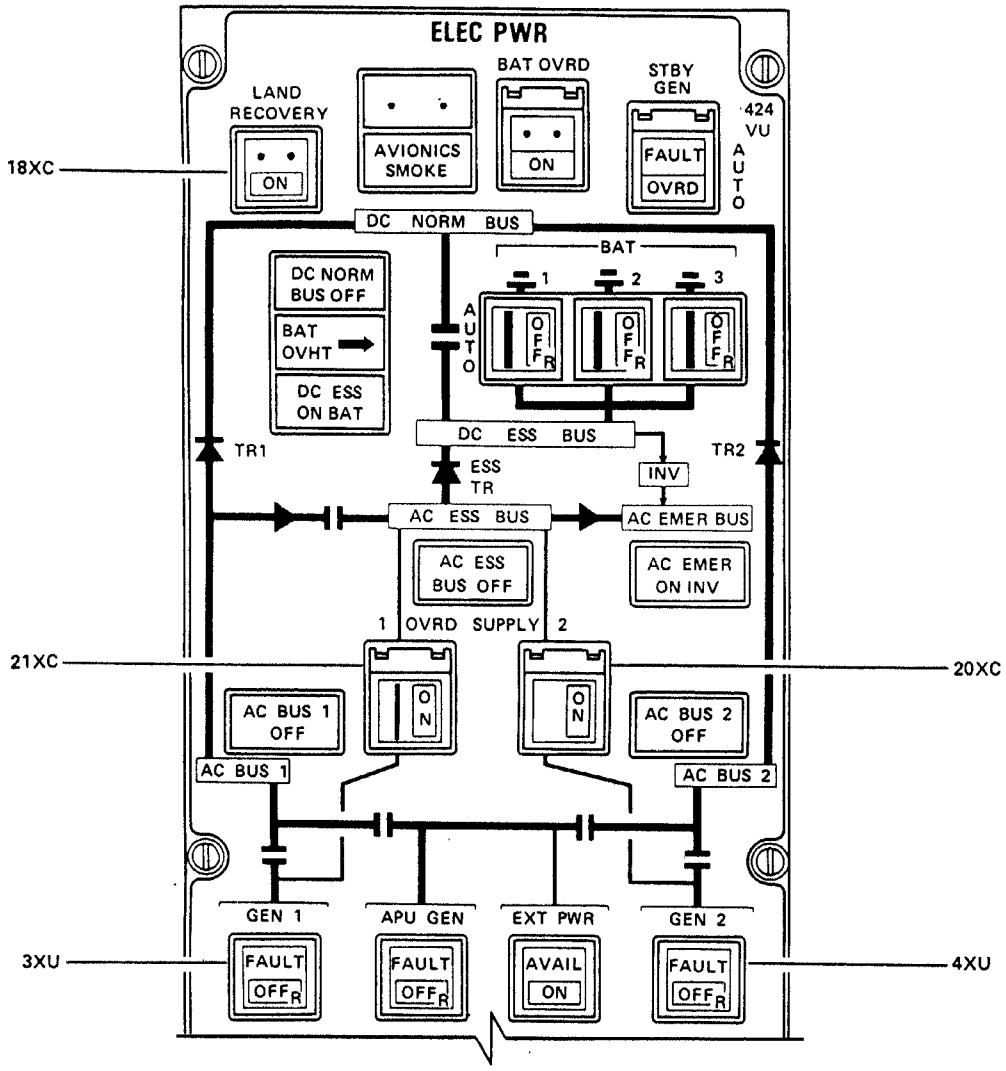
- their normal supply in normal flight configuration,
- partial recovery of some equipment in case of emergency or smoke emergency procedure application.

2. Component Location

(Ref. Fig. 001, 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11
12XC	CNTOR-ESS BUS GEN 1/2 SUPPLY	101VU	121	121BL	24-25-11
18XC	P/BSW-LAND RECOVERY	424VU	211		24-25-00
20XC	P/BSW-OVRD SUPPLY 2	424VU	211		24-25-00
21XC	P/BSW-OVRD SUPPLY 1	424VU	211		24-25-00
1XU	GCU-GEN1	101VU	121	121BL	24-22-12
2XU	GCU-GEN2	101VU	121	121BL	24-22-12
3XU	P/BSW-GEN1	424VU	211		24-22-00
4XU	P/BSW-GEN2	424VU	211		24-22-00
9XU	CNTOR-GEN1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR-TRANSFER, SYS1	101VU	121	121BL	24-22-18
12XU	CNTOR-TRANSFER, SYS2	101VU	121	121BL	24-22-18
15XE	CNTOR-AC STBY	101VU	121	121BL	24-24-55





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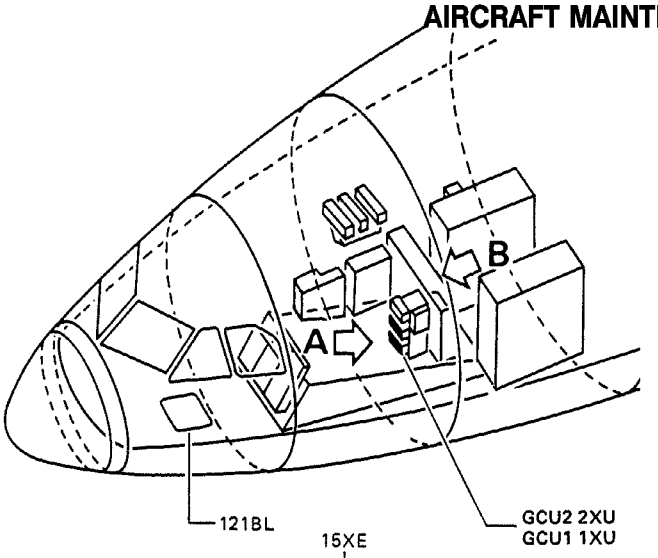
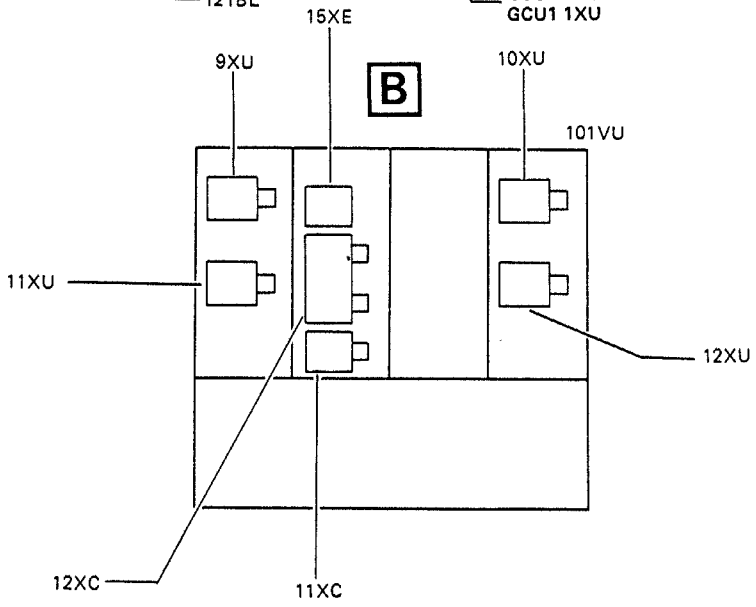
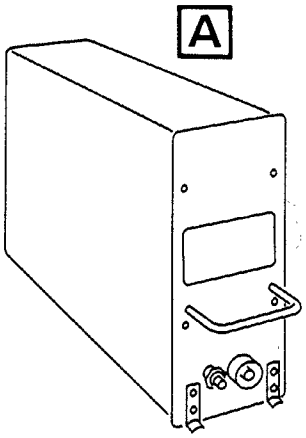
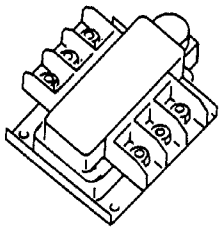
AC Essential Generation Switching
Control and Indicating - Location
Figure 001



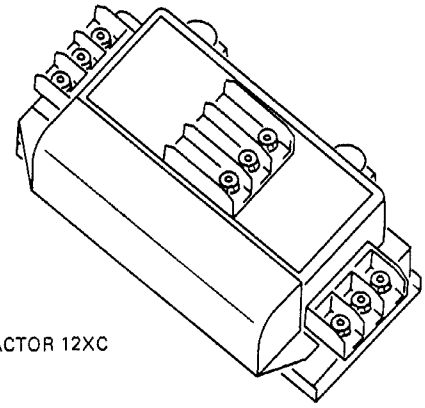




GCU 1XU - 2XU



CONTACTORS - 9XU - 10XU - 11XU - 12XU - 11XC



CONTACTOR 12XC

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AC Essential Generation Switching - Avionics Compartment - Location
Figure 002

3. Supply Controls and Indications of the Essential Network and Transformer Rectifier

(Ref. Fig. 003)
(Ref. Fig. 004)

The essential distribution network and transformer rectifier may be supplied :

- either by normal busbar 1,
- or directly by generator 1, upstream of its line contactor,
- or directly by generator 2, upstream of its line contactor.

This supply selection is controlled from the flight compartment overhead panel by means of two safety guarded **ELEC PWR/OVRD SUPPLY** 1 and 2 pushbutton switches with two stable **ON/OFF** positions :

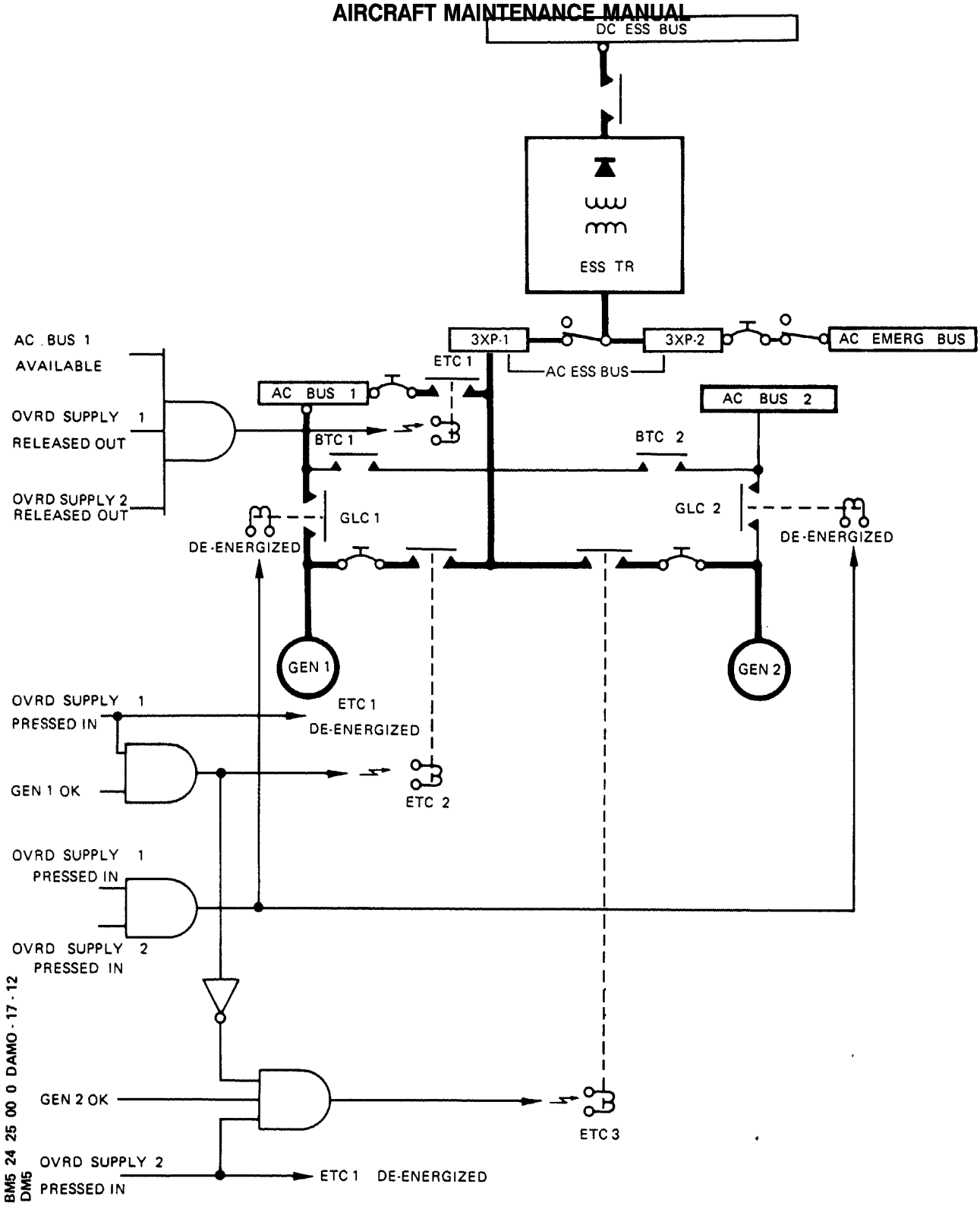
- when the two pushbutton switches are selected to **OFF** (released out position), the essential network and **TR** are supplied by normal busbar **1XP**. This corresponds to the pushbutton switch normal configuration.
- when one of the two pushbutton switches, either 1 or 2, is selected to **ON** (pressed in position), the essential network and **TR** are directly supplied by the corresponding generator 1 or 2. The position of the control is indicated by the illumination in white of the corresponding legend. The position of the tie contactor (**ETC** 2 or 3) is indicated by the flowbar on the **LH** side of the pushbutton switch, showing the continuity (or discontinuity) of the panel synoptic.
- when the two pushbutton switches are selected to **ON**, the essential network and **TR** are directly supplied by generator 1.
  Moreover, this selection commands the opening of the two generator 1 and 2 line contactors, and thus the switching off of the whole aircraft **AC** and **DC** normal networks (Ref. 24-22 and 24-35).

NOTES : - A command of power supply transfer of the essential network and **TR** directly to one generator (upstream of its line contactor) will only be effective if the generator is available :
. **ELEC PWR/GEN** pushbutton switch selected for generator operation
. power supply electrical parameters correct (**PR** relay of the corresponding **GCU** energized, Ref. 24-22).
- In the case of both **ELEC PWR/OVRD SUPPLY** 1 and 2 pushbutton switches selected to **ON**, the power supply is transfered automatically to generator 2 if generator 1 is not available.

4. Equipment Recovery Control : **LAND RECOVERY**

This control used in emergency configuration and when smoke emergency procedure is applied, enables recovery of the following equipment for landing :

- normal braking with anti-skid
R - spoilers 1, 4, 6 and 7
R - system 1 flaps and slats.
R Recovery is obtained by pressing **LAND RECOVERY** pushbutton switch with two
R stable positions, located in flight compartment overhead panel
R (Ref. 24-00-00, P. Block 1).
R - **OFF** selected : pushbutton switch released out.
R - **ON** selected : pushbutton switch pressed in, for recovery of the above
R mentioned equipment in emergency or smoke emergency configurations.
R NOTE : In normal configuration, activation of the control causes a power



AC Essential Generation Switching
Figure 003

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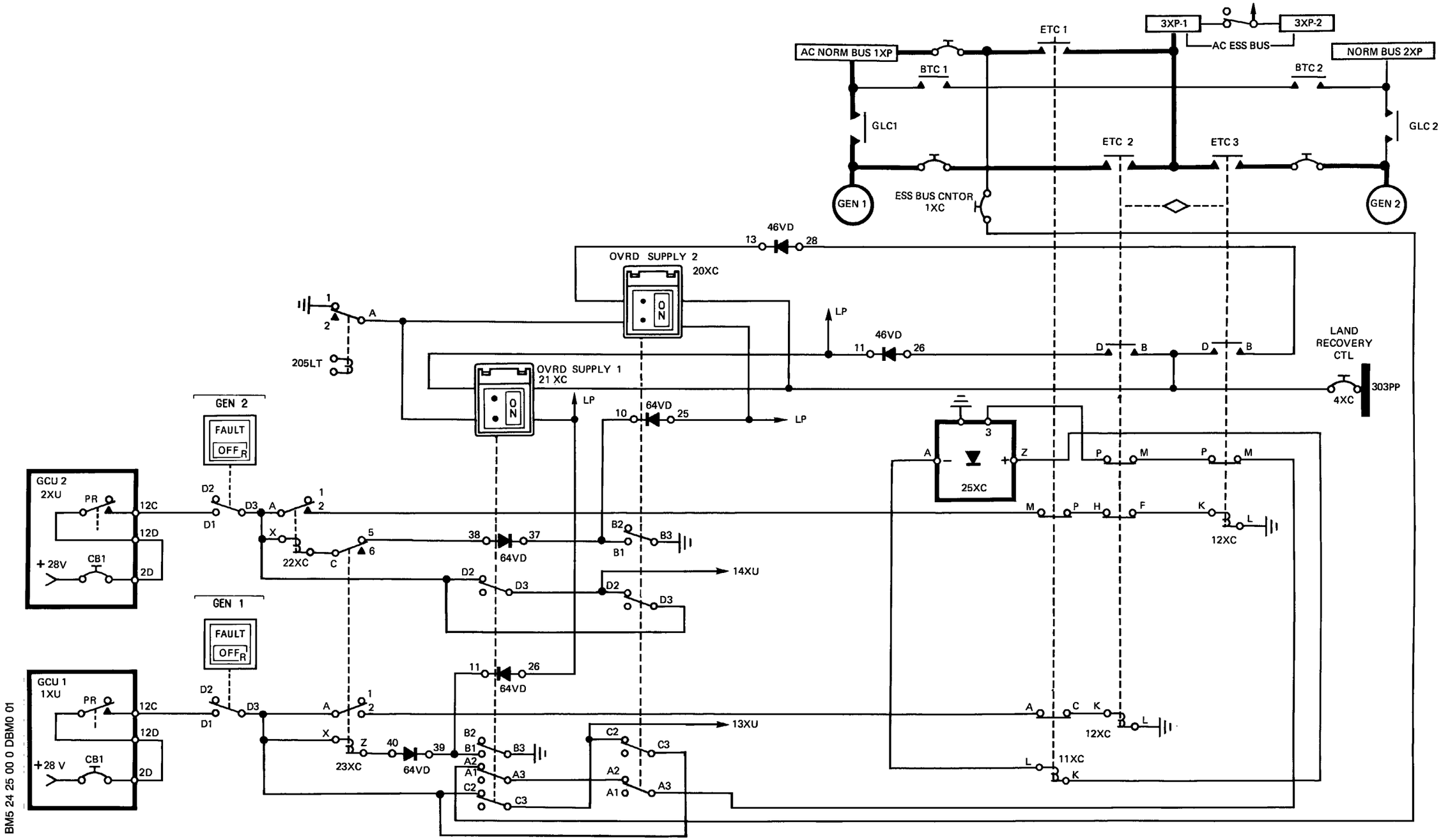

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AC Essential Generation Switching
Figure 004

R supply transfer and thus a brief interruption in the supply of the
R a.m. equipment.

1. Operational Test of Essential Busbar Power Supply

A. Reason for the Job
To check AC essential busbar 3XP from generator 1 or generator 2.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 71-00-00, P. Block 501	Power Plant - General
- 31-51-00, P. Block 1	ECAM System

C. Procedure
(1)Job set-up
(a)Start-up both engines (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network.
(b)Start-up ECAM (Ref. 31-51-00, P. Block 1).
(c)On ELEC IND panel 425VU
- place AC selector switch in BUS ESS position.

NOTE : On panel 424VU, make certain that APU GEN and EXT PWR pushbutton switches are released (out).

(2)Test

ACTION	RESULT
1. On panel 424VU - open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on On panel 425VU - no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- open the safety guard and press and release out OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch go off On panel 425VU - no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- open the safety guard and press OVRD SUPPLY 2 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on On panel 425VU

ACTION	RESULT
	- no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on. - On OVRD SUPPLY 2 pushbutton switch, flowbar goes off and ON legend remains on. - AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights come on. On panel 425VU - no change On R ECAM display unit - No display
- press and release GEN 1 pushbutton switch.	On panel 424VU - OFF legend of this pushbutton switch comes on. - OVRD SUPPLY 2 pushbutton switch flowbar comes on, OVRD SUPPLY 1 pushbutton switch flowbar goes off. - ON legend of these pushbutton switches remains on. - AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights remain on. On panel 425VU - no change On R ECAM display unit - No display
- press GEN 1 pushbutton switch, open the safety guards and press and release OVRD SUPPLY 1 and 2 pushbutton switches.	On panel 424VU - all lights go off On panel 425VU - no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- press and release GEN 1 pushbutton switch.	On panel 424VU - OFF legend of this pushbutton switch comes on. - AC BUS 1 OFF warning light remains off. On R ECAM display unit

ACTION	RESULT
	- check that display corresponds to indications on panels 424VU and 425VU.
- press GEN 1 pushbutton switch, press and release GEN 2 pushbutton switch.	On panel 424VU - OFF legend of GEN 1 pushbutton switch goes off. - OFF legend of GEN 2 pushbutton switch comes on. - AC BUS 2 OFF warning light remains off. On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- press GEN 2 pushbutton switch	On panel 424VU - OFF legend of this pushbutton switch goes off. On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.

(3)Close-up
(a)Stop ECAM (Ref. 31-51-00, P. Block 1).
(b)De-energize the aircraft electrical network and shut down both engines (Ref. 71-00-00, P. Block 501).

CONTACTORS (11XC, 12XC) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices
Referenced Procedures - 24-25-00, P. Block 501	AC Essential Generation Switching - Adjustment/Test

2. Procedure

(Ref. Fig. 401, 402)

NOTE : Removal/Installation is identical for contactors 11XC and 12XC.

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : This is to avoid 115 volt on contactors which are upstream of EXT PWR line contactor.

(2) Open access door 121BL.

(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4) In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting APU start.

(5) In avionics compartment, remove ESSENTIAL door from AC power center 101VU.

B. Removal (Ref. Fig. 402)

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS.

(1) Disconnect connectors (1).

(2) Remove nuts (4) and remove power connections.

(3) Remove the four attachment screws (2) with washers (3).

(4) Retain contactor (5).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

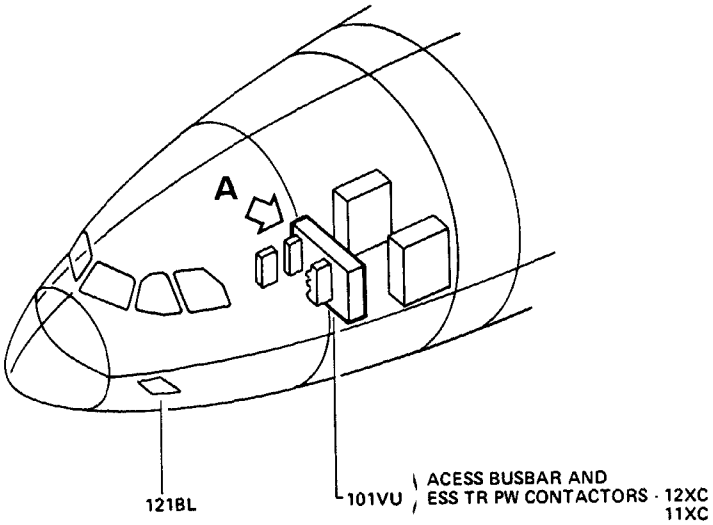
(1) Position contactor (5) and secure with the four screws (2) and washers (3).

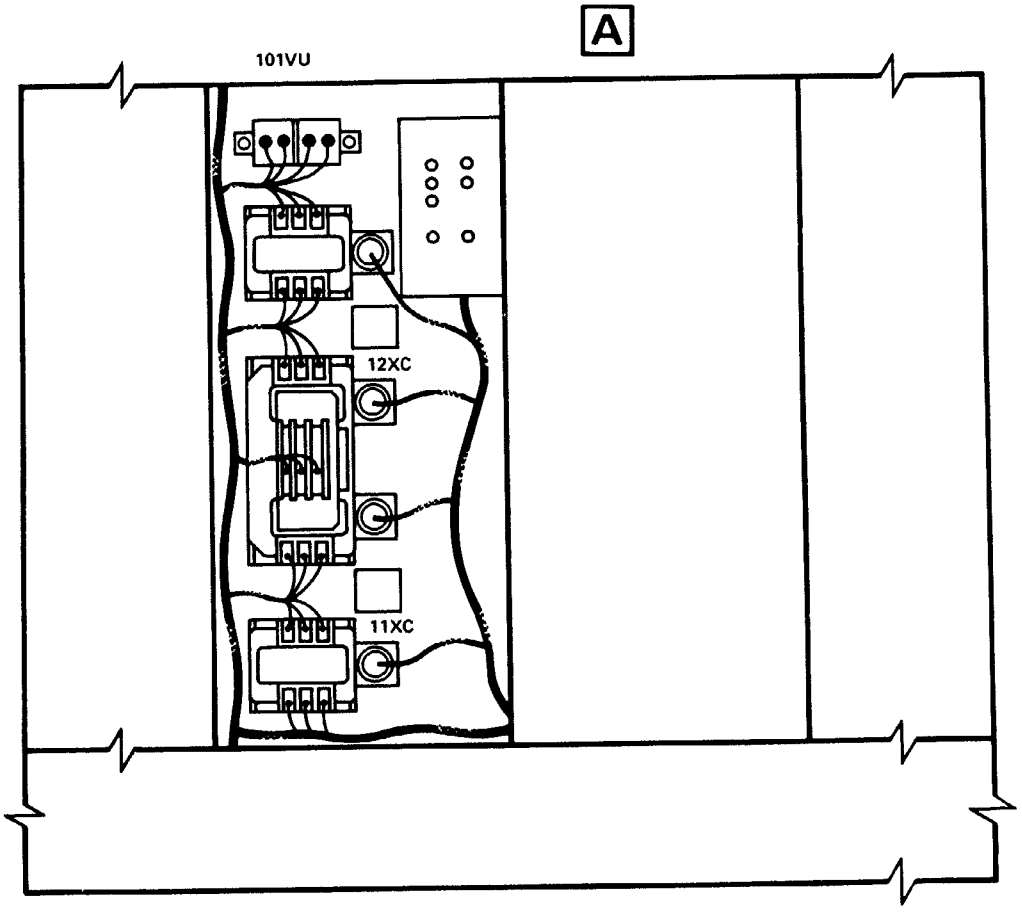
(2) Secure the different power connections with nuts (4).

R (3) TORQUE nuts (4) to between 0.25 and 0.30 m.daN (22.13 and 26.5 lbf.in.).

R (4) Connect connectors (1).

D. Test





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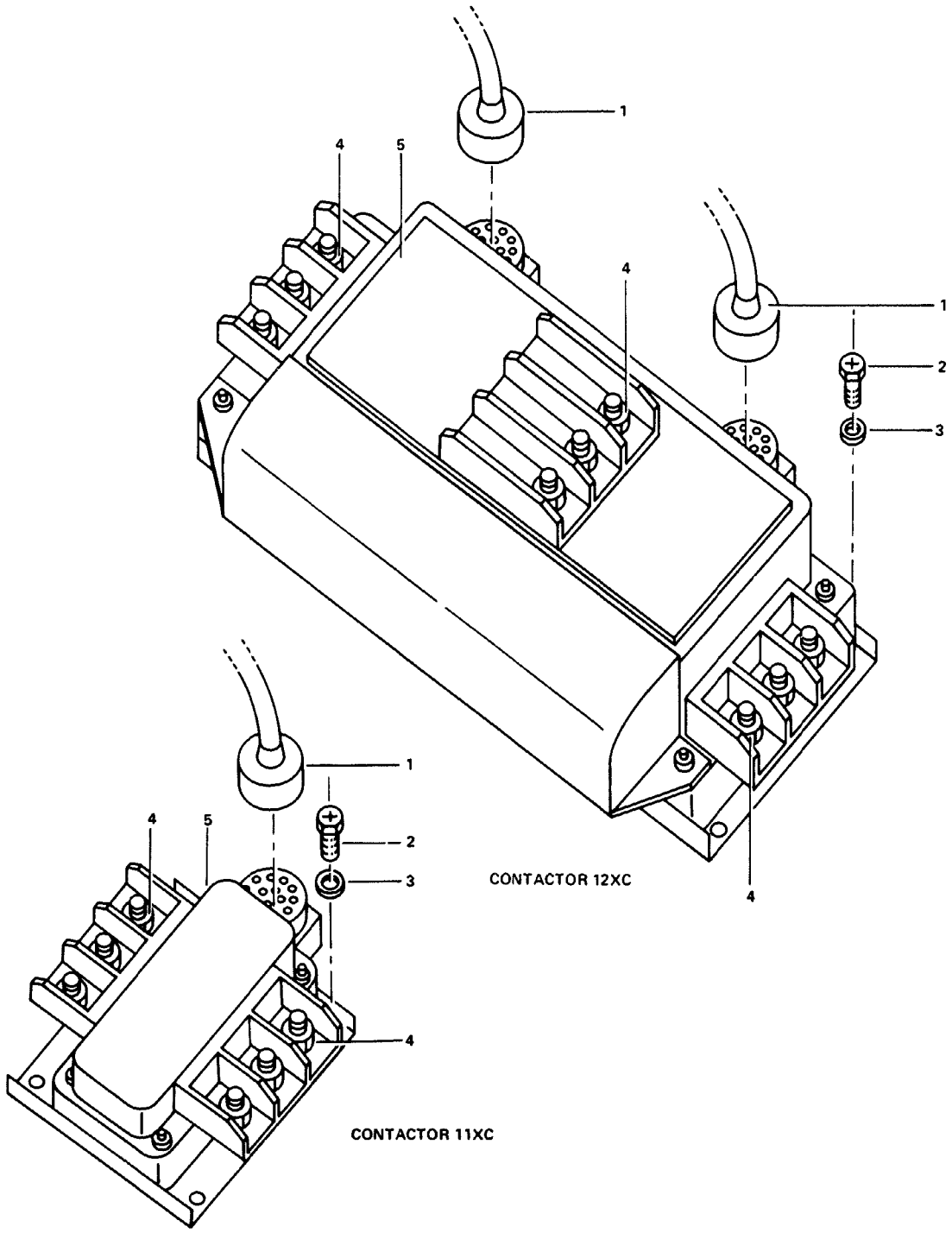
Contactors 11XC, 12XC - Location
Figure 401



Contactors 11XC and 12XC
Figure 402

(1)Do the operational test of essential busbar power supply (Ref. AMM 24-25-00, P. Block 501).

E. Close-Up

(1)Install ESSENTIAL door on AC power center 101VU.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.

GALLEY SUPPLY CONTROL

1. General (Ref. Fig. 001, 002)

**ON A/C 006-100,

The galley assembly (60KVA available) is divided into two parts :
- main (40KVA)
- secondary (20KVA) (Ref. 24-56).

**ON A/C 001-005,

The galley assembly (80KVA available) is divided into two parts :
- main (65KVA)
- secondary (15KVA) (Ref. 24-56).

R **ON A/C 101-200,

R The galley assembly (80KVA available) is divided into two parts :
R - main (60KVA)
R - secondary (20KVA) (Ref. 24-56).

**ON A/C ALL

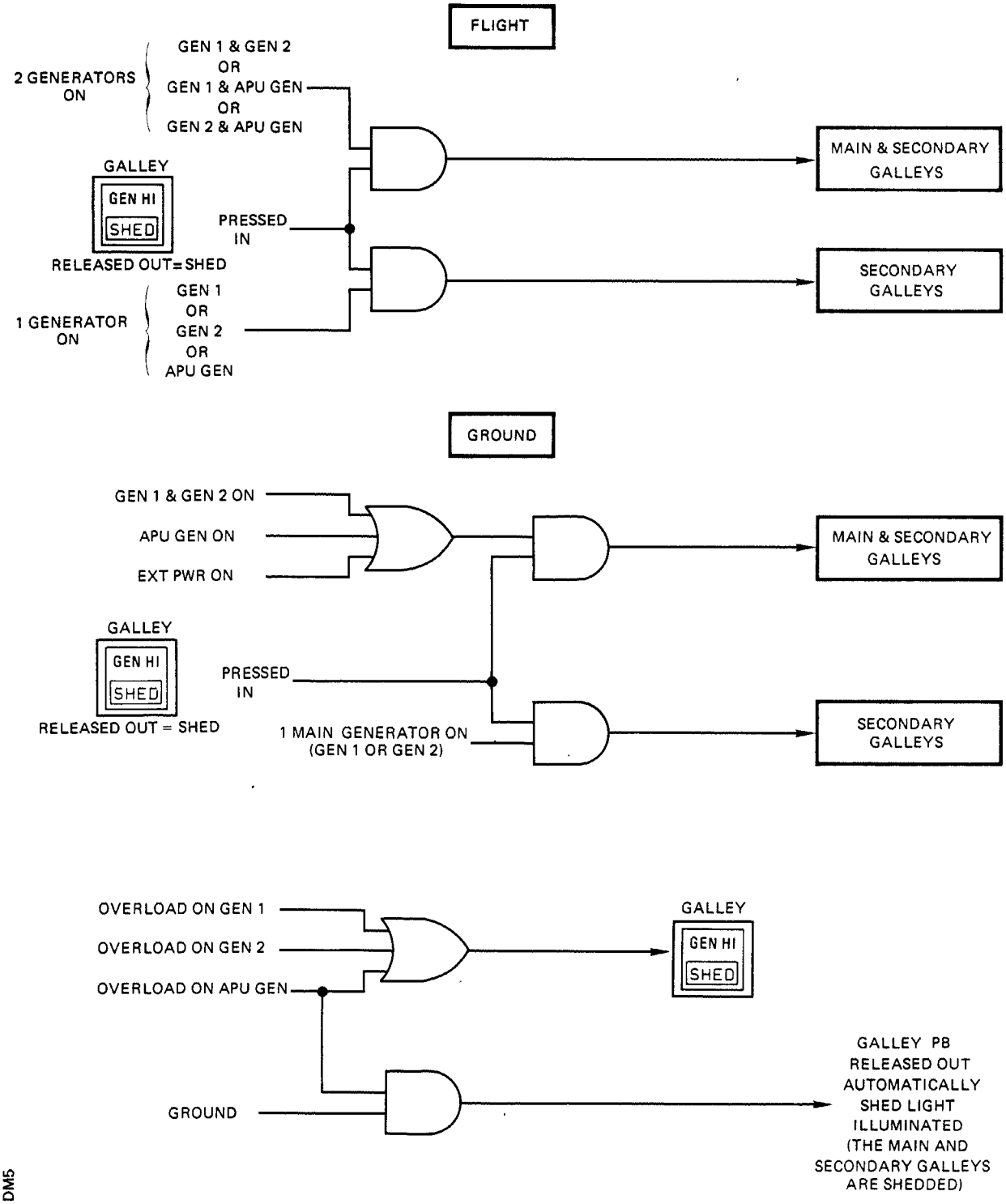
The galley general supply is controlled from flight compartment overhead panel by the two position ELEC PWR/GALLEY pushbutton switch :
- ON selected galley assembly is supplied.
  This position is electromagnetically self-held and may be unlatched in certain configurations (Ref. below).
- SHED selected galleys are no longer supplied. Selection of this command is indicated by the illumination in white of the corresponding legend.

NOTE : The individual controls of the ovens, water heaters, etc, are located in the galleys themselves.
Amber GEN HI legend comes on and is accompanied by a warning on the warning light display panel in case of overload of one of the three aircraft generators (load > 95.5KVA for more than (10 sec.))
GEN HI warning goes off when the overload has disappeared.

**ON A/C 006-100,

In flight, it is normally possible to supply all the galleys. But, in case of failure, the main part (40KVA) is automatically shed when the aircraft is only supplied by one of the three generators.
The secondary galleys only are supplied (20 KVA). On the ground, it is possible to supply all the galleys :
- either from the ground power unit
- or from the APU generator only.

In the second case, an overload of the generator results in an automatic and complete shedding by unlatching of the control and illumination of SHED legend.



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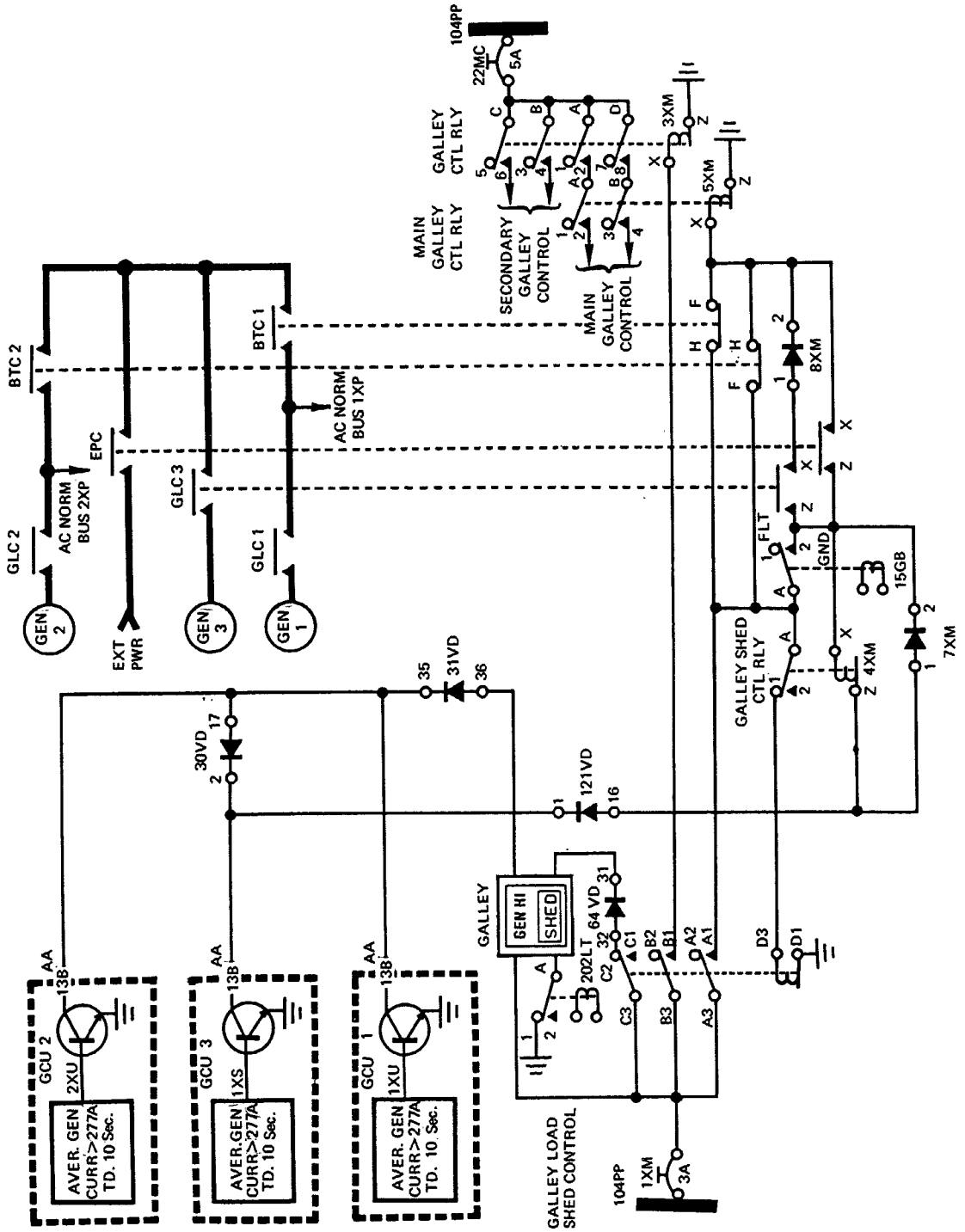
Galley Supply Control - Schematic
Figure 001



BM5 24 26 00 0 ACNO 07

Galley Supply Control
Figure 002

**ON A/C 001-005,

In flight, it is normally possible to supply all the galleys. But, in case of failure, the main part (65 KVA) is automatically shed when the aircraft is only supplied by one of the three generators.
The secondary galleys only are supplied (15 KVA). On the ground, it is possible to supply all the galleys :
- either from the ground power unit
- or from the APU generator only.
In the second case, an overload of the generator results in an automatic and complete shedding by unlatching of the control and illumination of SHED legend.

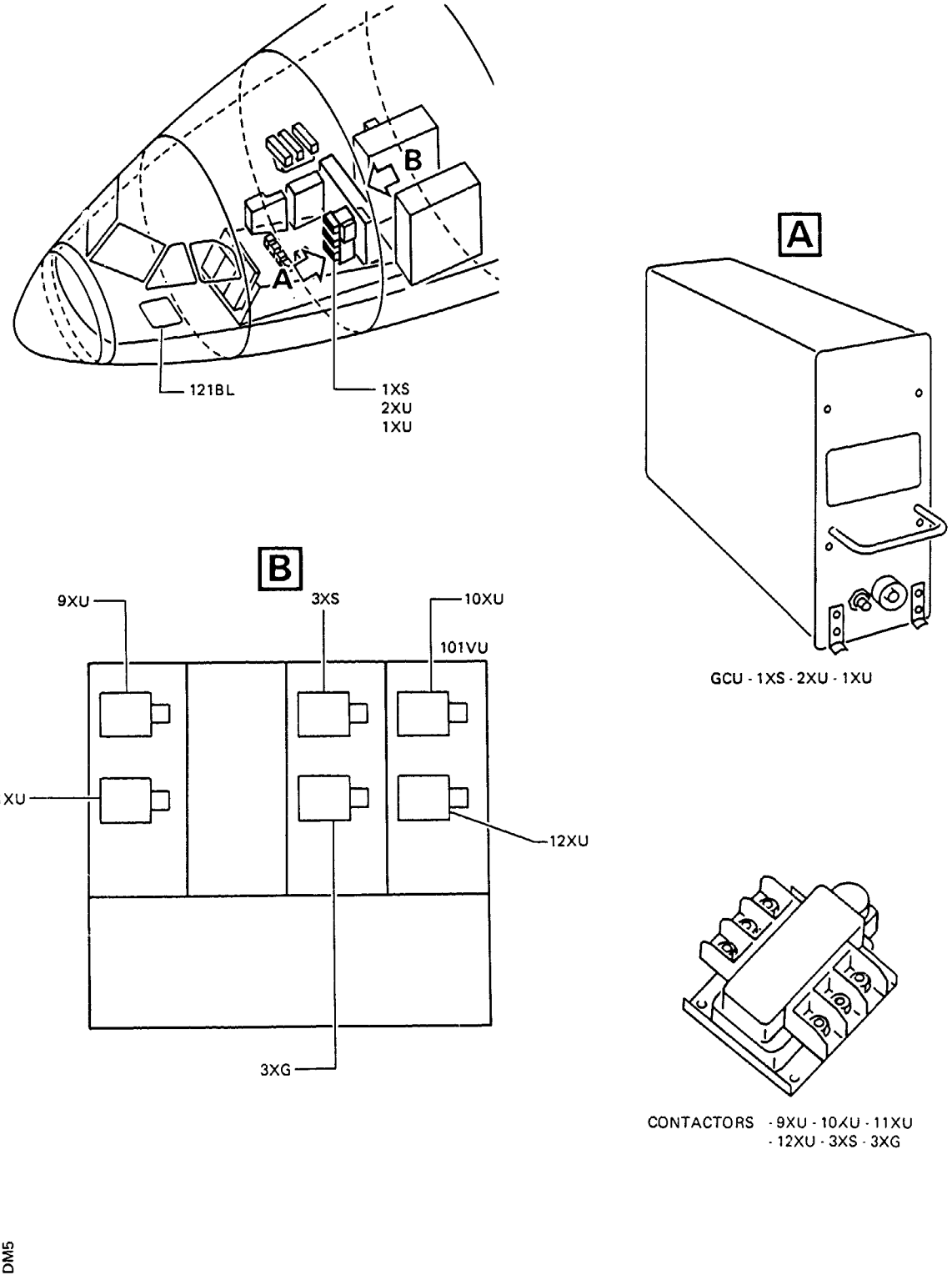
R **ON A/C 101-200,

R In flight, it is normally possible to supply all the galleys. But, in case of
R failure, the main part (60 KVA) is automatically shed when the aircraft is
R only supplied by one of the three generators.
R The secondary galleys only are supplied (20 KVA). On the ground, it is
R possible to supply all the galleys :
R - either from the ground power unit
R - or from the APU generator only.
R In the second case, an overload of the generator results in an automatic and
R complete shedding by unlatching of the control and illumination of SHED
R legend.

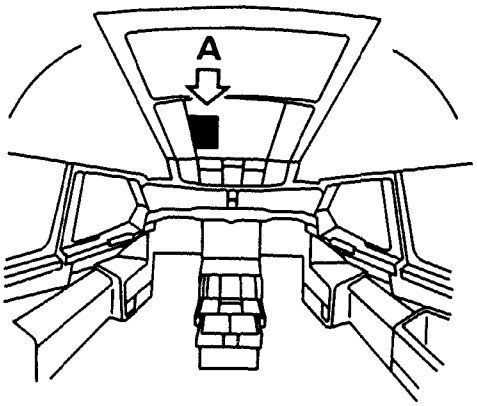
**ON A/C ALL

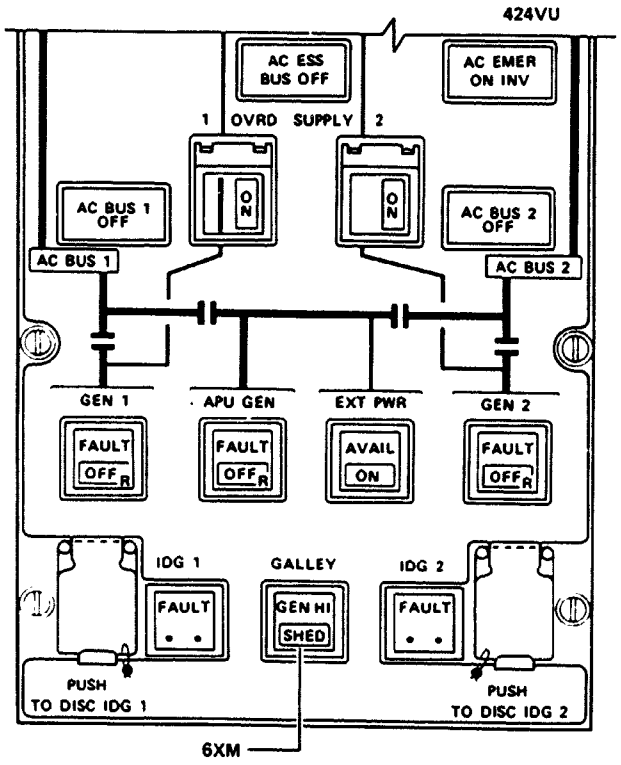
2. Component Location
(Ref. Fig. 003)
(Ref. Fig. 004)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
3XG	CNTOR - AC EXT PWR	101VU	121	121BL	24-41-12
6BM	P/BSW - ELEC PWR/GALLEY	424VU	211		24-26-00
1XS	GCU - APU	101VU	121	121BL	24-23-12
3XS	CNTOR - APU GEN PWR LINE	101VU	121	121BL	24-23-13
1XU	GCU - GEN1	101VU	121	121BL	24-22-12
2XU	GCU - GEN2	101VU	121	121BL	24-22-12
9XU	CNTOR - GEN1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR - GEN2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR - TRANSFER, SYS1	101VU	121	121BL	24-22-18
12XU	CNTOR - TRANSFER, SYS2	101VU	121	121BL	24-22-18



Galley Supply Control - Avionics Compartment - Location
Figure 003





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Galley Supply Control - Controls and Indicating - Location
Figure 004

1. General

(Ref. Fig. 001)
(Ref. Fig. 002)

Monitoring and indicating of the aircraft A/C generation and distribution is performed by means of voltmeter, frequency meter and load indicators located on the flight compartment overhead panel.

A selector switch enables selection of the parameters displayed on the indicators :

- voltage and frequency of :
  . normal busbars 1 and 2
  . essential busbar
  . ultimate emergency busbar
- voltage, frequency and load of the three aircraft generators (IDG1, IDG2, APU generator)
- voltage and frequency of the ground power unit.

NOTE : As far as the voltage and frequency information from the four available generation sources (IDG1, IDG2, APU generator and ground power unit) are concerned, it is also possible to select the corresponding supply phase using a selector switch located on the maintenance panel.

- for each aircraft generator, the load information is given by the GCU, which processes it from signals sent by the current transformers, mounted in the generator (Ref. 24-22-00, P. Block 1 and Ref. 24-23-00, P. Block 1).

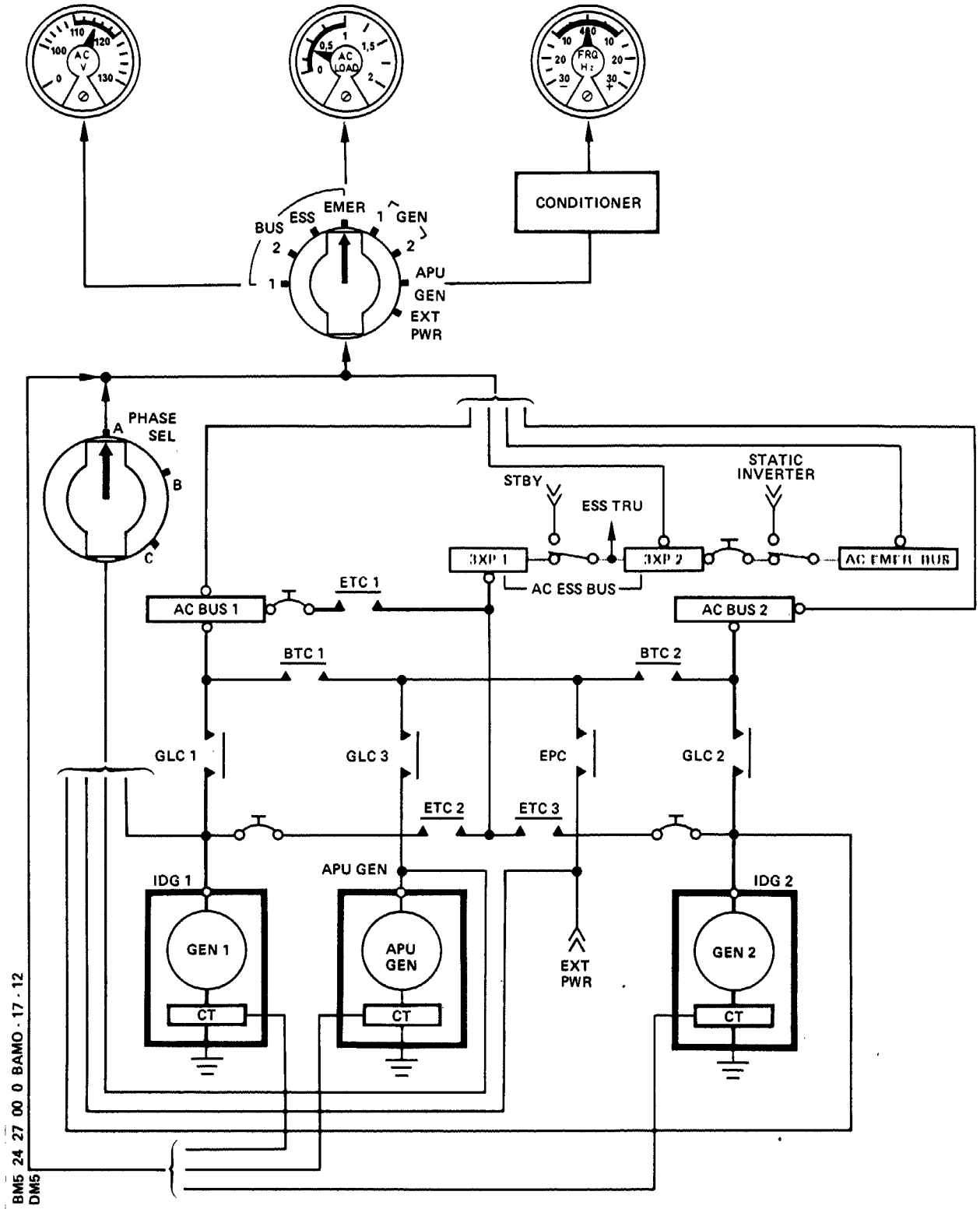
It should be noted that data related to the four generation sources are also displayed on the ECAM display unit (phase A for voltage and frequency data) (Ref. 24-00-00, P. Block 1).

2. Component Location

(Ref. Fig. 003)
(Ref. Fig. 004)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11
12XC	CNTOR-ESS BUS GEN 1/2 SUPPLY	101VU	121	121BL	24-25-11
3XG	CNTOR-AC EXT PWR	101VU	121	121BL	24-41-12
1XS	GCU-APU	101VU	121	121BL	24-23-12
3XS	CNTOR-APU GEN PWR LINE	101VU	121	121BL	24-23-13
8XS	GENERATOR-APU AC		311		
9XS	CURRENT TRANSFORMER-APU GEN	101VU	121	121BL	24-23-00
1XU	GCU-GEN 1	101VU	121	121BL	24-22-12
2XU	GCU-GEN 2	101VU	121	121BL	24-22-12
9XU	CNTOR-GEN 1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN 2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR-TRANSFER, SYS 1	101VU	121	121BL	24-22-18
12XU	CNTOR-TRANSFER, SYS 2	101VU	121	121BL	24-22-18
21XU	CURRENT TRANSFORMER-GEN 1	101VU	121	121BL	24-22-00
22XU	CURRENT TRANSFORMER-GEN 2	101VU	121	121BL	24-22-00
17XV	SWITCH-PHASE SEL	472VU	212		24-27-00

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
19XV	CONDITIONER-FREQUENCY		212		24-27-00
20XV	FREQUENCY METER	425VU	211		24-27-00
21XV	VOLTMETER-AC	425VU	211		24-27-00
25XV	LOADMETER-AC	425VU	211		24-27-00
29XV	SWITCH-AC PARAMETER SEL	425VU	212		24-27-00



A/C Generation Monitoring and Indicating - Schematic
Figure 001

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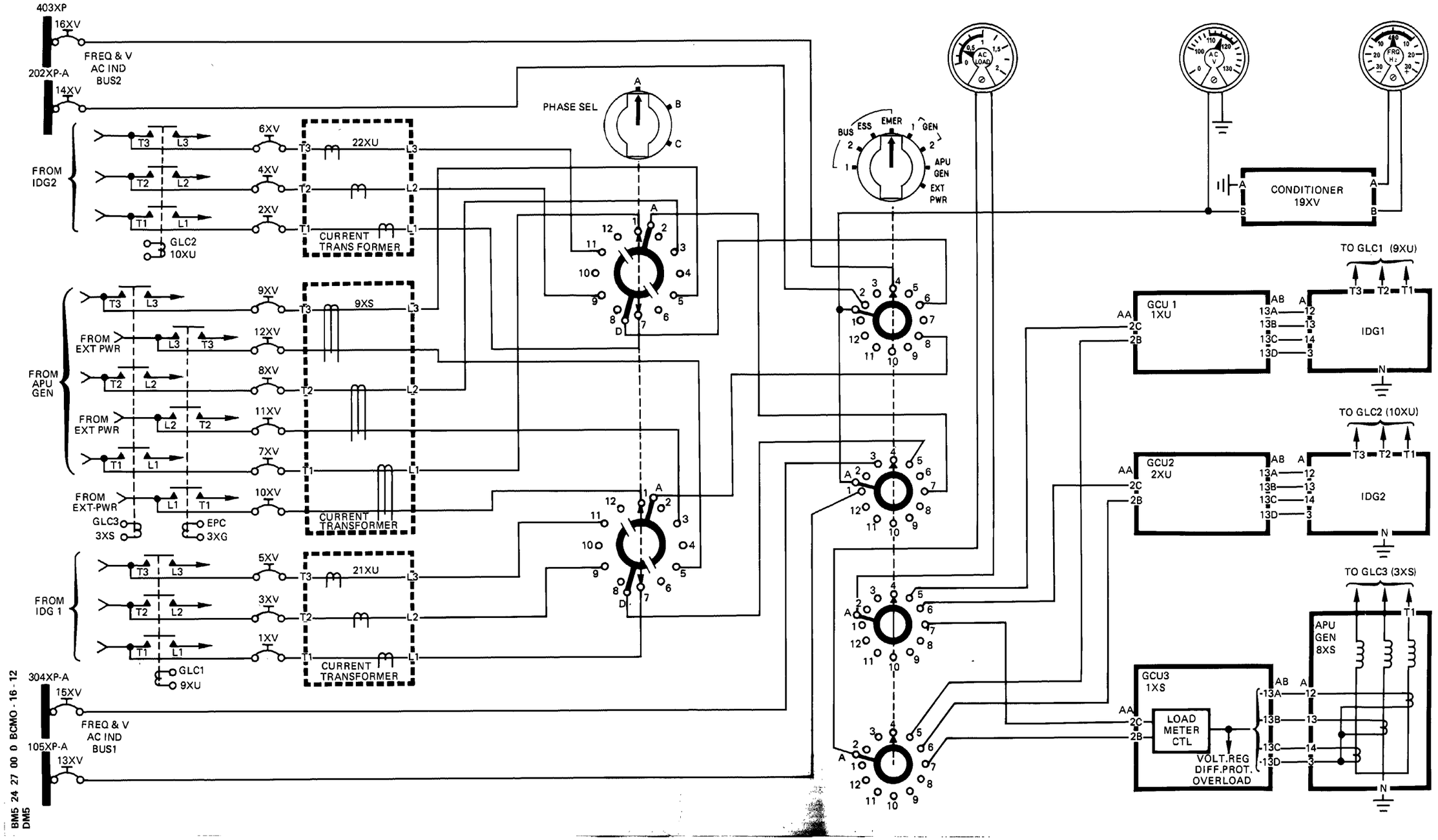
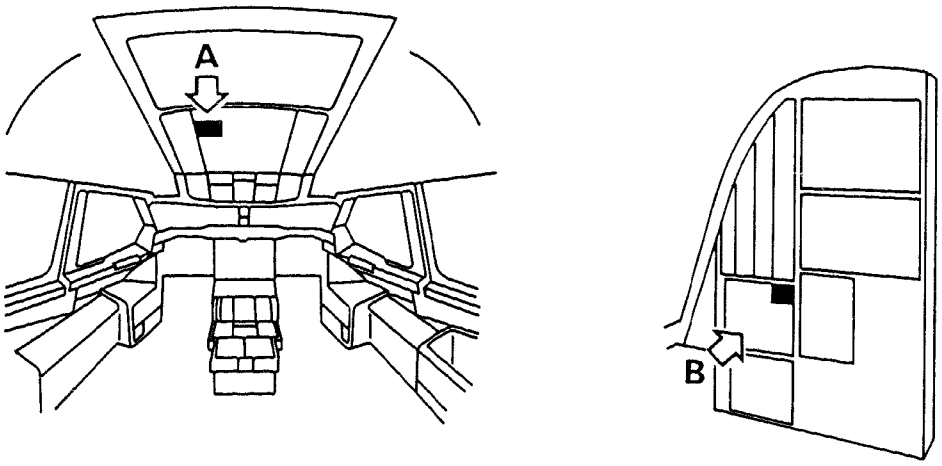
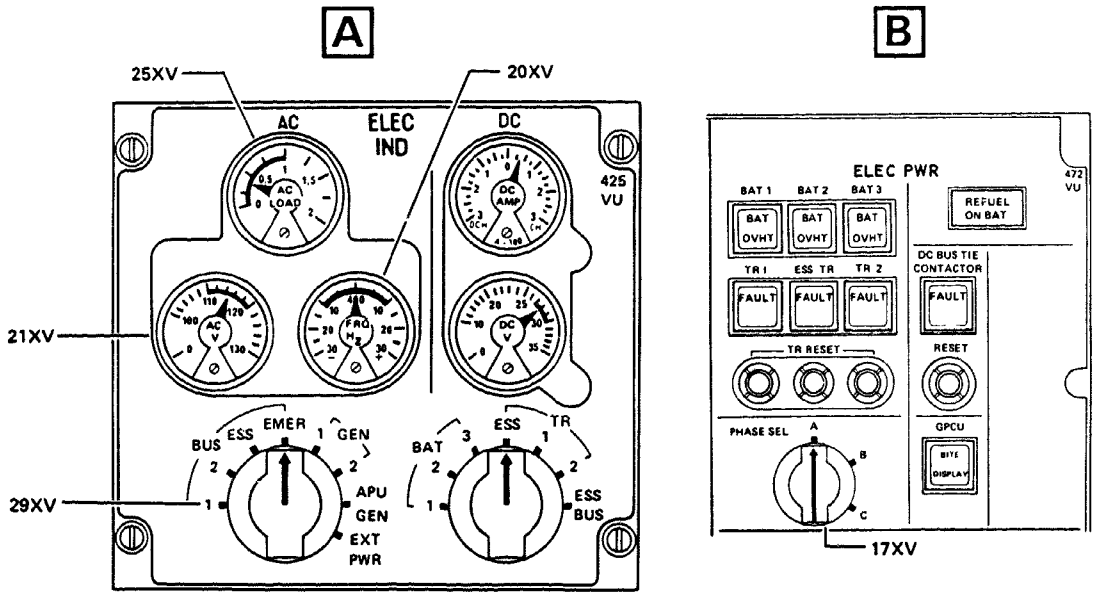


A/C Generation Monitoring and Indicating
Figure 002





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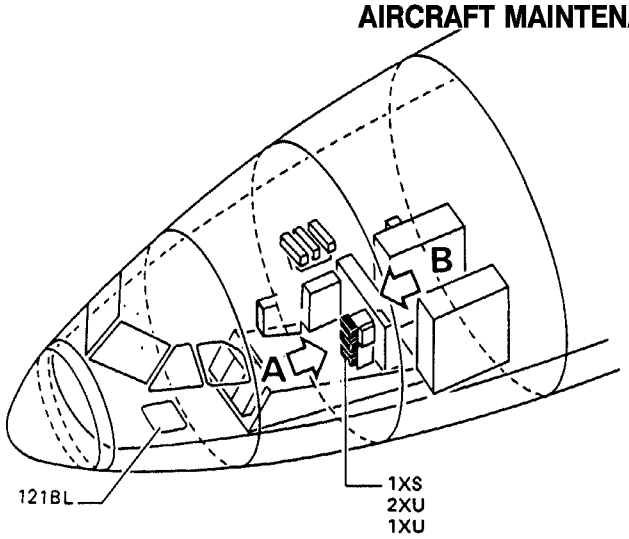
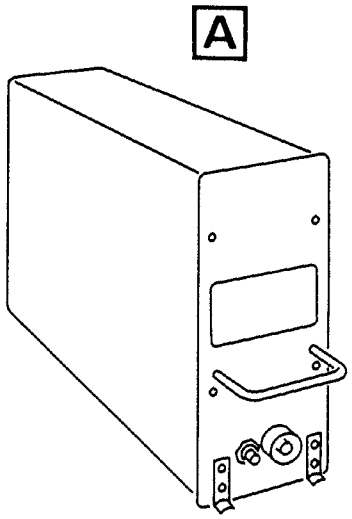
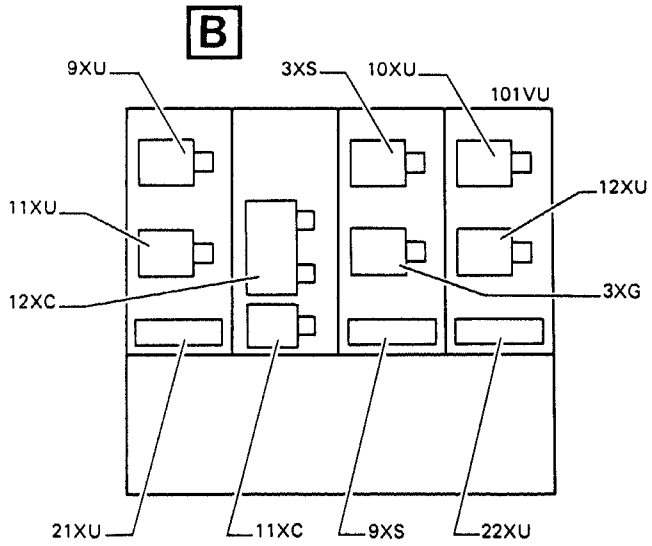
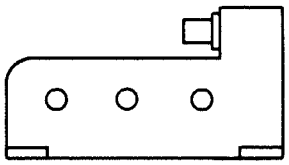
A/C Monitoring and Indicating - Controls and Indicating - Location
Figure 003



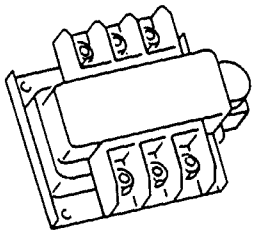


GCU - 1XS - 2XU - 1XU

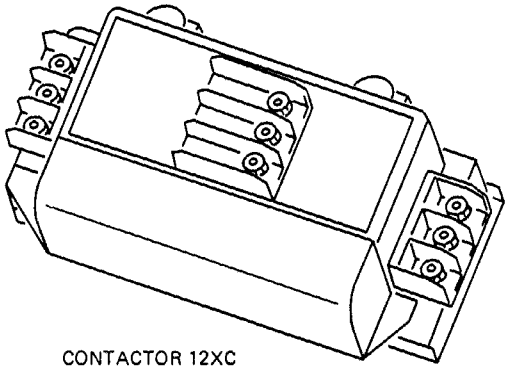




CURRENT TRANSFORMERS
21XU - 22XU - 9XS



CONTACTORS - 9XU - 10XU - 11XU
- 12XU - 3XS - 3XG
- 11XC



CONTACTOR 12XC

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A/C Monitoring and Indicating - Avionics Compartment - Location
Figure 004

1. Operational Test

A. Reason for the Job
Check AC indicating system for correct operation.

B. Procedure
(1)Job set-up
Do not supply aircraft electrical network.
(2)Test

ACTION	RESULT
On panel 424VU 1. Press the three BAT pushbutton switches.	On panel 424VU - check that AC BUS 1 OFF, AC BUS 2 OFF, AC ESS BUS OFF and AC EMER ON INV warning lights come on - check that OFF or FAULT legends of GEN 1 and GEN 2 pushbutton switches come on - other annunciator lights come on which must not be taken into account.
2. Press and release the three BAT pushbutton switches.	On panel 424VU - all annunciator lights go off.

2. Functional Test

A. Main AC Generation Indicating System Check (Engine Running)
(1)Reason for the job
Check AC indicating system for correct operation.
(2)Equipment and materials

ITEM	DESIGNATION
Referenced Procedure - 71-00-00, P. Block 501	Power Plant - General

(3)Procedure
(a)Job set-up
1 Start-up both engines (Ref. 71-00-00, P. Block 501) and energize aircraft electrical network.
2 Make certain that ECAM circuit breakers are closed and activate R ECAM display unit.
3 Select ELEC AC page.
(b)Test

ACTION	RESULT
1. On panel 425VU - place AC parameter selector switch in GEN 1 (2) position.	On panel 425VU - check voltage, frequency and load on indicators. On R ECAM display unit - check correspondence with indications on panel 425VU.
2. On panel 472VU, ELEC PWR segment - place PHASE SEL switch successively in A, B and C positions.	On panel 425VU - no change. On R ECAM display unit - no change.
3. On panel 424VU - press the two OVRD SUPPLY pushbutton switches.	On panel 424VU - ON legend of the two OVRD SUPPLY pushbutton switches come on - the flowbar of OVRD SUPPLY 1 pushbutton switch comes on - AC BUS 1 OFF and AC BUS 2 OFF warning lights come on - other annunciator lights come on which must not be taken into account.
4. On panel 425VU - place AC parameter selector switch in BUS 1 then BUS 2 position.	On panel 425VU - no indication must be displayed on indicators.
5. On panel 424VU - press then release the two OVRD SUPPLY pushbutton switches.	On panel 424VU - all annunciator lights go off. On panel 425VU - check voltage and frequency on indicators. On R ECAM display unit - check correspondence with indications on panels 424VU and 425VU.
- press and release GEN 1 pushbutton switch.	On panel 424VU - OFF legend of GEN 1 pushbutton switch comes on. On R ECAM display unit - check correspondence with indications on panel 424VU.
- press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend of OVRD SUPPLY 1 pushbutton switch comes on. - AC ESS BUS OFF and AC EMER ON INV warning lights come on.

ACTION	RESULT
	On R ECAM display unit - check correspondence with indications on panel 424VU.
- press and release OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - all annunciator lights go off except OFF legend of GEN 1 pushbutton switch.

(c)Close-up
1 De-energize the aircraft electrical network and shutdown both engines (Ref. 71-00-00, P. Block 501).
2 Restore system and aircraft to normal operating conditions.

3. Auxiliary and External AC Generation Indicating Check

A. Reason for the Job
To check auxiliary and external AC generaation indicating system for correct operation.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz, 90 KVA
Referenced Procedures	
- 24-23-00, P. Block 301	Auxiliary AC Generation
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network either by means of the APU (Ref. 24-23-00, P. Block 301) or the ground power unit (Ref. 24-41-00, P. Block 301).
(b)Make certain that circuit breakers of the ECAM system are closed and activate the R ECAM display unit.
(c)Select ELEC AC page.
(2)Test

ACTION	RESULT
1. On panel 425VU - place AC parameter selector switch in APU GEN (EXT PWR) position.	On panel 425VU - check voltage frequency and load on indicators. On R ECAM display unit - check correspondence with indications on panel 425VU.
2. On panel 472VU, ELEC PWR segment	On panel 425VU

ACTION	RESULT
- place PHASE SEL switch successively in A, B and C position.	- no change. On R ECAM display unit - no change.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) or (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating conditions.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-27-00, P. Block 501	AC Monitoring and Indicating
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set-Up

(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make sure that ventilation of electronic racks is correct.
(3)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	VOLT/FREQ	1XV	GEN1/C4
101VU	VOLT/FREQ	2XV	GEN2/C11
101VU	VOLT/FREQ	3XV	GEN1/C3
101VU	VOLT/FREQ	4XV	GEN2/C10
101VU	VOLT/FREQ	5XV	GEN1/C2
101VU	VOLT/FREQ	6XV	GEN2/C9
101VU	APU/GEN/VOLT/FREQ	7XV	APU/A12
101VU	APU/GEN/VOLT/FREQ	8XV	APU/A11
101VU	APU/GEN/VOLT/FREQ	9XV	APU/A10
101VU	EXT/PWR/VOLT/FREQ	10XV	APU/A9
101VU	EXT/PWR/VOLT/FREQ	11XV	APU/A8
101VU	EXT/PWR/VOLT/FREQ	12XV	APU/A7
133VU	AC BUS FREQ & V IND/BUS1	13XV	335/R79
133VU	AC BUS FREQ & V IND/BUS2	14XV	335/R82
133VU	AC BUS FREQ & V IND/ESS/BUS	15XV	335/R80
133VU	AC BUS FREQ & V IND/EMER/BUS	16XV	335/R81

B. Removal

(Ref. Fig. 401)
(1)Loosen but do not remove the screw (3).
(2)Pull indicator (4) out of panel (2).
(3)Disconnect electrical connector (1) from indicator (4).
(4)Install blanking cap on disconnected electrical connector (1).

C. Preparation for Replacement of Component

(1)Clean component interface and/or adjacent area.
(2)Inspect component interface and/or adjacent area.

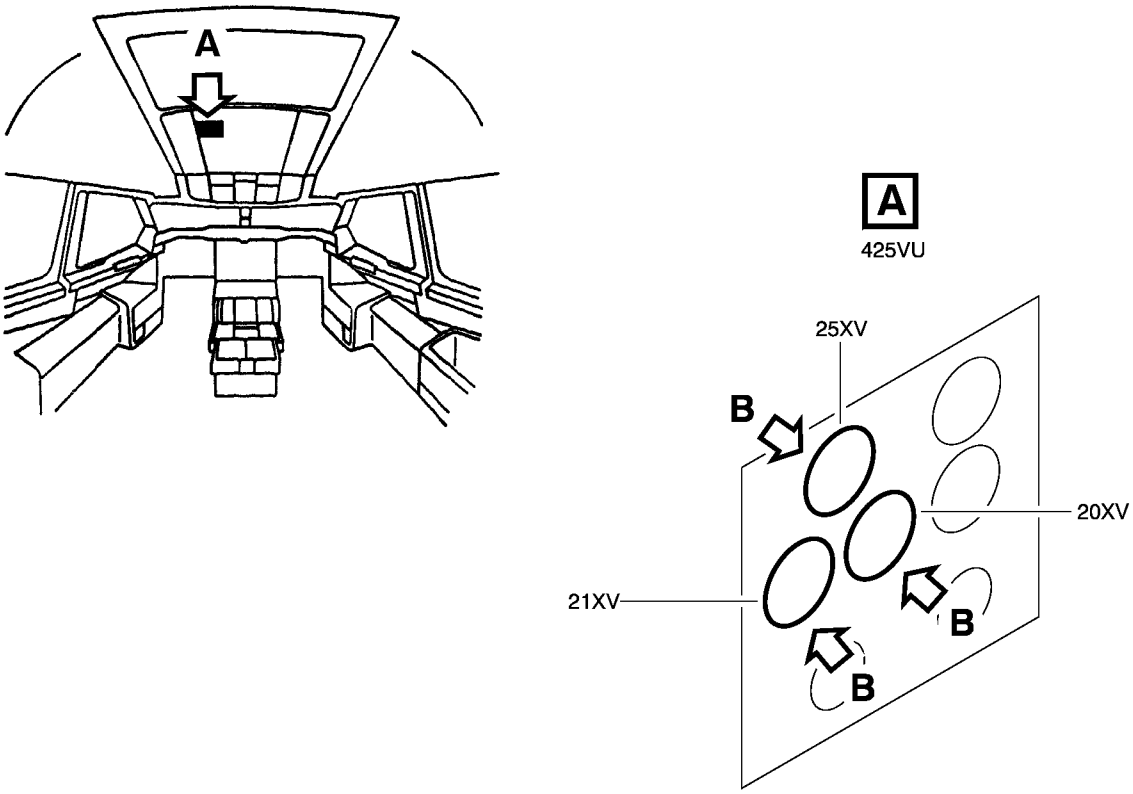
D. Installation

(Ref. Fig. 401)

(1)Remove blanking cap from electrical connector (1).
(2)Make sure that electrical connector is clean and in correct condition.
(3)Connect electrical connector (1) to indicator (4).
(4)Install and align indicator (4) in panel (2).
(5)Tighten screw (3).

E. Test
(1)Remove safety tags and close the circuit breakers 1XV, 2XV, 3XV, 4XV, 5XV, 6XV, 7XV, 8XV, 9XV, 10XV, 11XV, 12XV, 13XV, 14XV, 15XV and 16XV.
(2)Do a functional test of main AC generation indicating system and auxiliary and external AC generation indicating system (Ref. 24-27-00, P. Block 501).

F. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make sure that the working area is clean and clear of tools and miscellaneous items of equipment.



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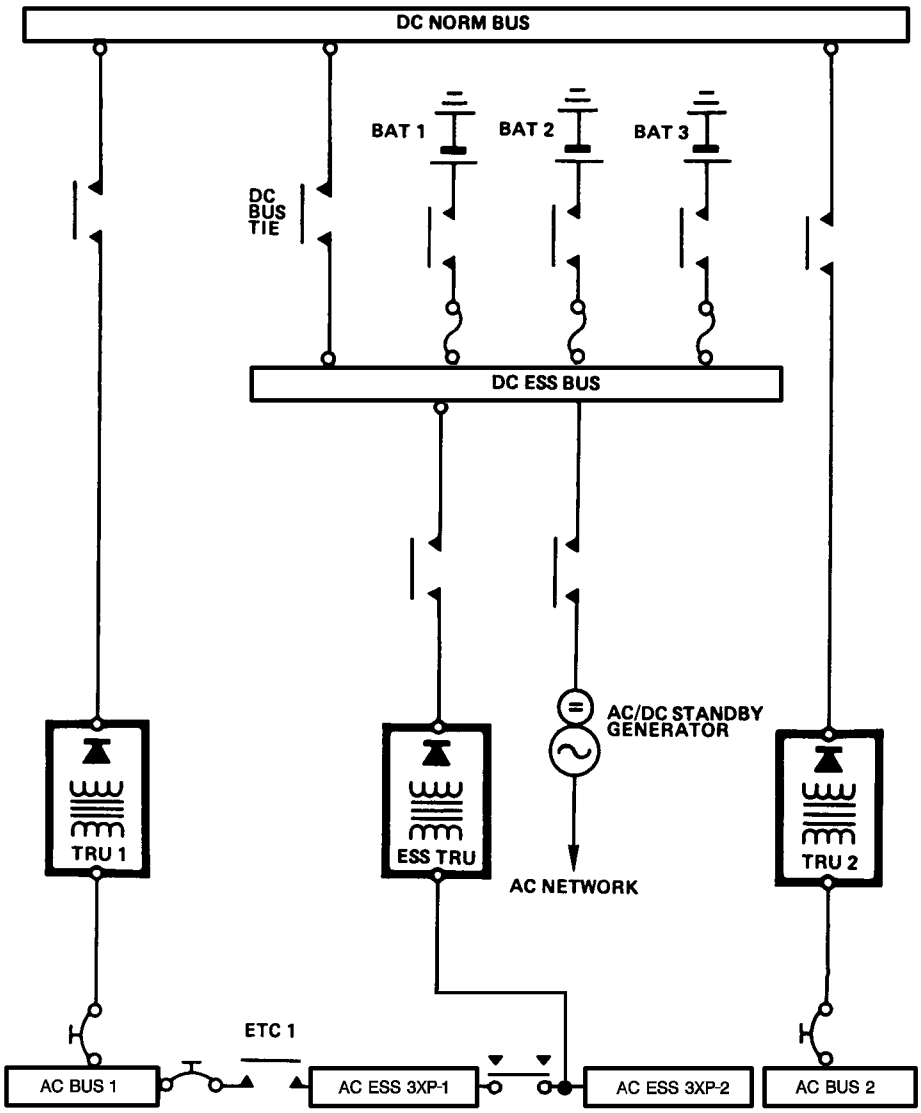
AC Indicators
Figure 401

DC GENERATION

The aircraft DC power generation is normally provided by three transformer - rectifiers enabling the whole onboard distribution network to be supplied
R (Ref. Fig. 001)

- TR1 and 2 and the associated circuits constitute the normal generation system (Ref. 24-32-00, P. Block 1)
- Essential TR, normal network/essential network ties and the associated circuits constitute the essential generation system (Ref. 24-35-00, P. Block 1)

In the event of a failure (emergency configuration) DC power is provided by three batteries (Ref. 24-31-00, P. Block 1)
Sheet 2 shows the location of the main components.
R (Ref. Fig. 002)



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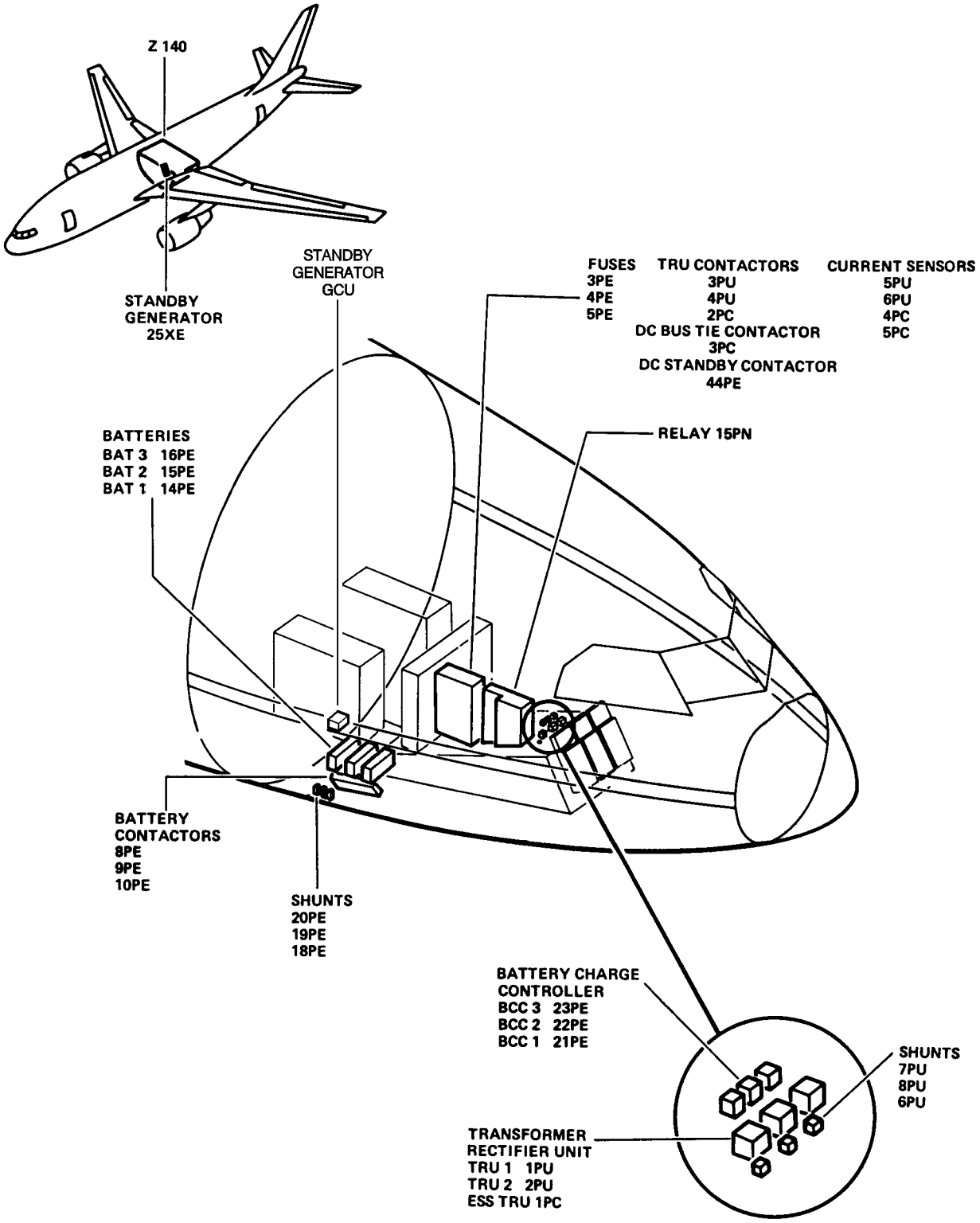
DC Generation - Block Diagram
Figure 001



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DC Generation - Component Location
Figure 002

R 1. Deactivation/Reactivation

R A. Deactivation
R Ref. MMEL - Sect 1-24, Item 18 ("BAT OVHT" lt.)
R (1)Reason for the job
The BAT OVHT indicating circuit can be inoperative provided that flowbar of BAT pushbutton switches, BAT indication on DC AMP indicator and the ECAM circuit operate.
R (2)Equipment and materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

R (3)Procedure
R (a)Job set-up
R 1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R 2 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 1	30PE	206/D24
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 2	31PE	206/D25
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 3	32PE	206/D26
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A 1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A 2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A 3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A 4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A 5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A 6

R 3 On panel 424VU make certain that :
- BAT1, 2 and 3 pushbutton switches are released out (OFF legend is on)
- BAT OVRD pushbutton switch is released out.

R 4 Make certain that ECAM circuit breakers are closed, activate the ECAM system and select DC page.
R (b)Test

ACTION	RESULT
(a)On battery charge controller - press test button for approximately 15 sec, then release.	On battery charge controller - after 10 sec maximum, test light comes on. On CAPT and F/O main instrument

ACTION	RESULT
	panels 3VU and 5VU - MASTER CAUTION lights come on, then go off accompanied by the single chime. On the L ECAM display unit - BAT OVHT.....OFF/R appears.
(b)On panel 424VU - press BAT OVRD pushbutton switch	On panel 424VU - ON legend of BAT OVRD pushbutton switch comes on - the flowbar of the three BAT pushbutton switches comes on (OFF legend remains on). On the R ECAM display unit - check that batteries are correctly coupled to ESS BUS busbar.
- press and release BAT OVRD push-button switch	On panel 424VU - ON legend of BAT OVRD pushbutton switch goes off - the flowbar of the three BAT pushbutton switches goes off (OFF legend remains on). On the R ECAM display - check that batteries are uncoupled from ESS BUS.
(c)On panel 424VU - press the three BAT pushbutton switches	On panel 424VU - OFF legend of these pushbutton switches go off, the flowbar comes on. On panel 425VU - check battery conditions and charge currents. On R ECAM display unit - check conformity with panels 424VU and 425VU.
(d)After a delay of between 1 and 20 min (depending on the initial charge of the battery)	On panel 424VU - the flowbar of BAT pushbutton switches must go off. On panel 425VU - check battery conditions - the charge currents must be null. On the R ECAM display unit - check conformity with panels 424VU and 425VU.
(e)On panel 425VU - place DC parameter selector switch successively in BAT1, 2 and 3 positions.	On panel 425VU, DC section - on indicators, check battery voltage and load or unload current. On R ECAM display unit - check that these indications

ACTION	RESULT
	correspond with those of panel 425VU.

R 2. Deactivation/Reactivation

R A. Deactivation
R Ref. MEL 24-31-04 BAT OVHT Light (FAA only)
R (1)Reason for the job
R The BAT OVHT indicating circuit can be inoperative provided that MASTER CAUTION and ECAM battery overheat warnings operate normally.
R (2)Equipment and materials

ITEM	DESIGNATION
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

R (3)Procedure
R (a)Job set-up
R 1 Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R 2 Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 1	30PE	206/D24
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 2	31PE	206/D25
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 3	32PE	206/D26
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A 1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A 2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A 3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A 4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A 6
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A 7

R 3 On panel 424VU make certain that :
R - BAT1, 2 and 3 pushbutton switches are released out (OFF legend is on)
R - BAT OVRD pushbutton switch is released out.
R 4 Make certain that ECAM circuit breakers are closed, activate the ECAM system and select DC page.
R (b)Test

ACTION	RESULT
(a)On battery charge controller - press test button for approxima-	On battery charge controller - after 10 seconds maximum, test

ACTION	RESULT
tely 15 seconds then release.	light comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on, then go off accompanied by the single chime. On the L ECAM display unit - BAT OVHT.....OFF/R appears.

(c)Close-up

1 De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

B. Reactivation

Ref. TSM 24-31-00.

DC GENERATION BY STANDBY GENERATOR OR BY BATTERIES

1. General

DC generation by the standby generator or the batteries enables power to be supplied to the essential service required for controlling the aircraft in case of loss of both main generation sources and of non-availability of the AC auxiliary generation (emergency configuration). It also provides self-starting of the APU in flight or on the ground.

A. Standby Generator

The standby generator delivers 50A nominal power under 28V. The generator is protected by a generator control unit (GCU) which controls the opening and closing of its line contactor.

B. Batteries

The three batteries are of the 25Ah Nickel Cadmium type.
Each battery is associated with a charge controller which main functions are :

- to control battery charging, which is performed by coupling or uncoupling the battery on the network.
- to monitor this charge and detect a thermal runaway.
- impose an automatic recovery of the essential network in the event of its normal supply loss.

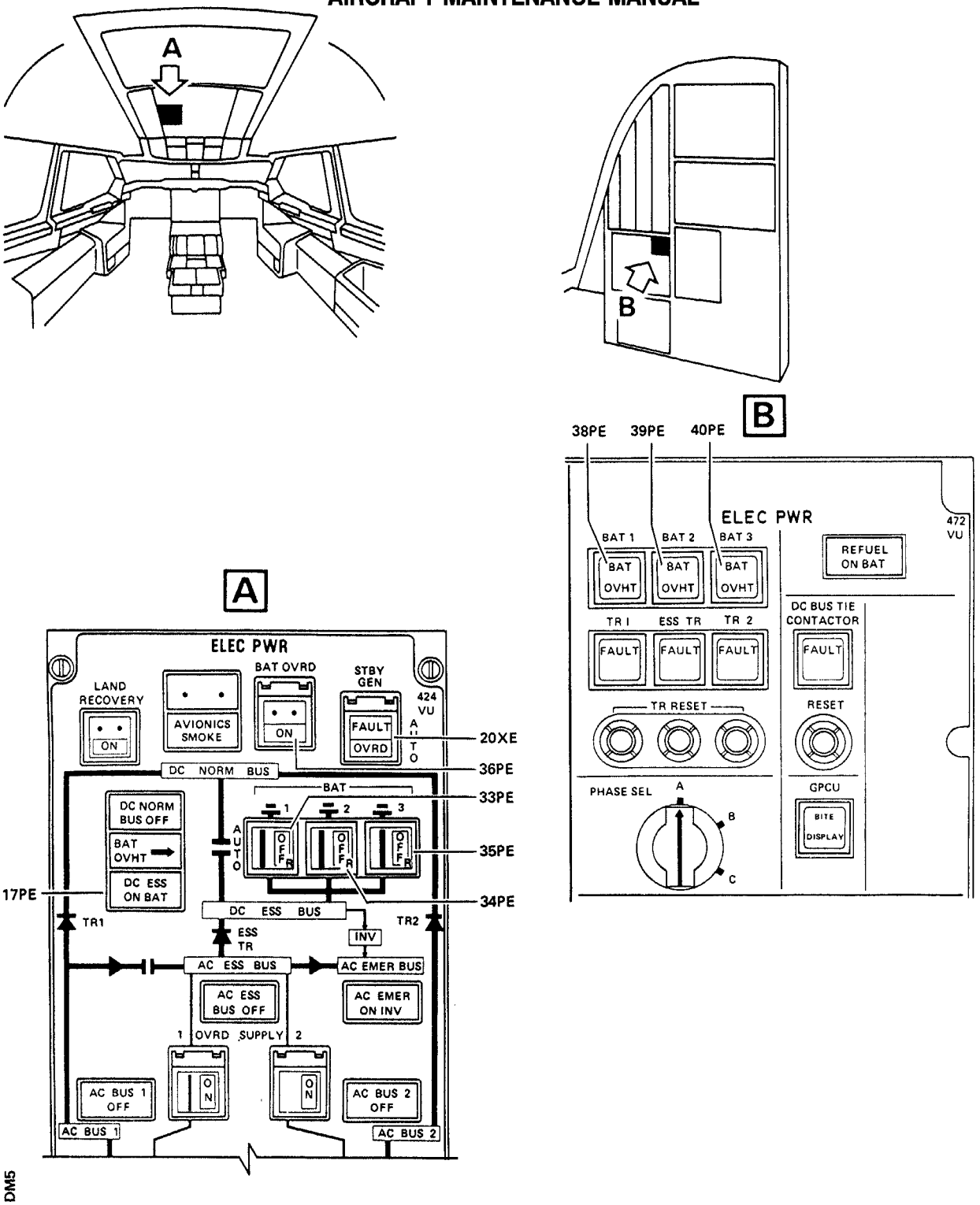
It should be noted that in normal configuration the batteries are uncoupled from the network during most of the flight.

C. Selection of DC Generation Supply Mode

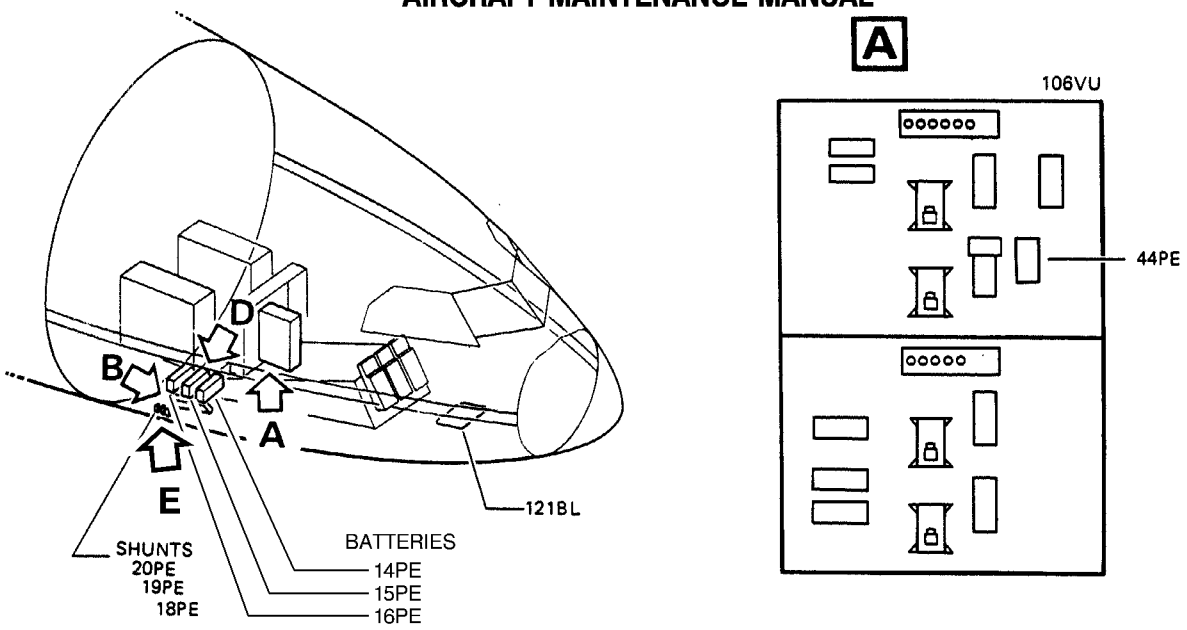
The DC generation cannot be simultaneously supplied by the standby generator and the batteries, since the standby generator cannot simultaneously supply the DC essential network and provide charge current for the batteries.

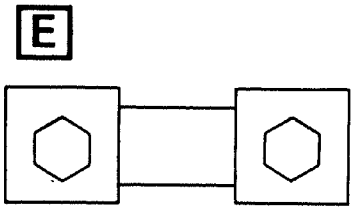
2. Component Location
(Ref. Fig. 001, 002, 003)
(Ref. Fig. 004)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	3PE	FUSE-BAT1	106VU	122	121BL	24-31-00
	4PE	FUSE-BAT2	106VU	122	121BL	24-31-00
	5PE	FUSE-BAT3	106VU	122	121BL	24-31-00
	8PE	CNTOR-BAT3	281VU	122	121BL	24-31-00
	9PE	CNTOR-BAT2	281VU	122	121BL	24-31-00
	10PE	CNTOR-BAT1	281VU	122	121BL	24-31-00
	14PE	BATTERY 1		122	121BL	24-31-11
	15PE	BATTERY 2		122	121BL	24-31-11
	16PE	BATTERY 3		122	121BL	24-31-11
	17PE	WARNING LIGHT-BAT OVHT	424VU	211		24-31-00
R	18PE	SHUNT-BAT1		122	121BL	24-31-41
R	19PE	SHUNT-BAT2		122	121BL	24-31-41
R	20PE	SHUNT-BAT3		122	121BL	24-31-41
R	21PE	CONTROLLER-BAT1 CHARGE		122	121BL	24-31-12
R	22PE	CONTROLLER-BAT2 CHARGE		122	121BL	24-31-12
R	23PE	CONTROLLER-BAT3 CHARGE		122	121BL	24-31-12
	33PE	P/BSW-BAT1	424VU	211		24-31-00
	34PE	P/BSW-BAT2	424VU	211		24-31-00
	35PE	P/BSW-BAT3	424VU	211		24-31-00
	36PE	P/BSW-BAT OVRD	424VU	211		24-31-00
	38PE	MFA-BAT1	472VU	212		24-31-00
	39PE	MFA-BAT2	472VU	212		24-31-00
	40PE	MFA-BAT3	472VU	212		24-31-00
	44PE	CNTOR - STANDBY	106VU	122	121BL	24-31-00
	20XE	P/BSW-STBY GEN	424VU	211		24-24-00
	25XE	GENERATOR-STANDBY		140		24-24-51
	26XE	GCU-STANDBY GENERATOR		122	121BL	24-24-34

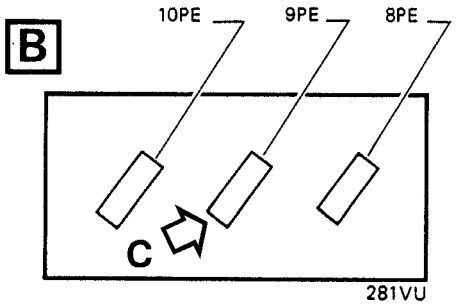


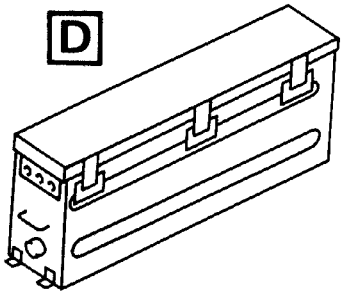
Component Location in Flight Compartment
Figure 001



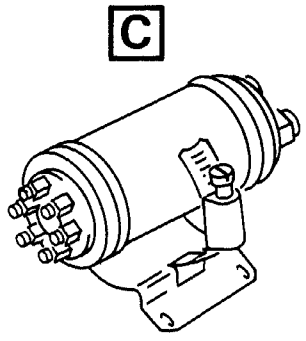


SHUNTS 18PE 19PE 20PE





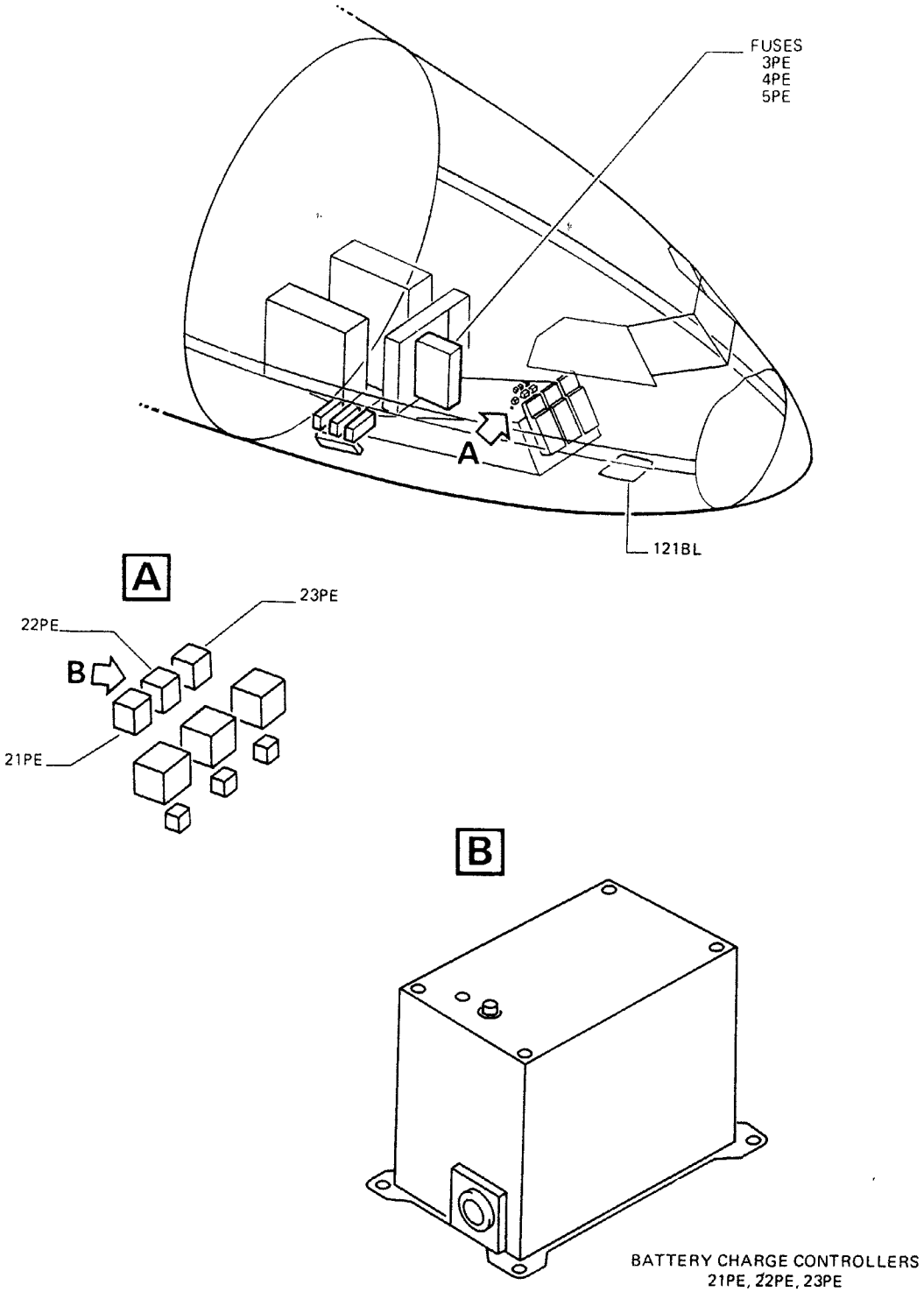
BATTERIES 14PE, 15PE, 16PE



CONTACTORS 8PE, 9PE, 10PE

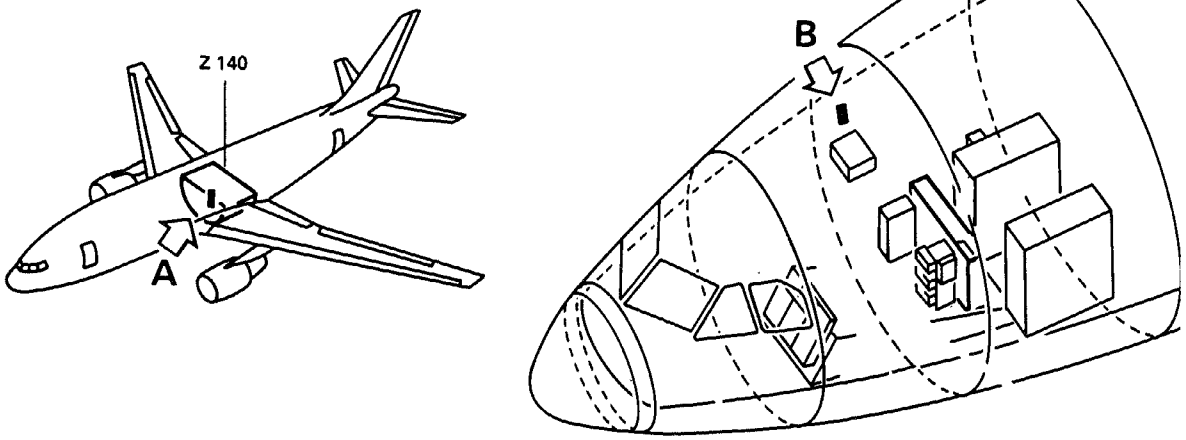
BM5 24 31 00 0 BAF0 01

R Component Location in Avionics Compartment
Figure 002

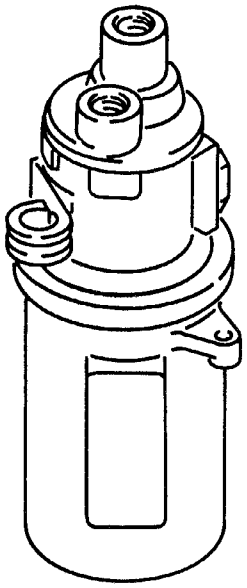


BM5 24 31 00 0 AAHO - 07 - 03
DM5

Component Location in Avionics Compartment
Figure 003

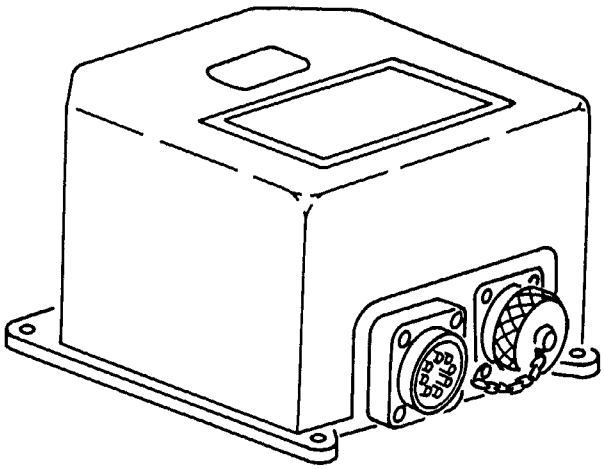


A



STANDBY GENERATOR 25XE

B



STANDBY GENERATOR
CONTROL UNIT (GCU)
26XE

BM5 24 31 00 0 BAKO - 20 - 15
DM5

Component Location
Figure 004

3. Control and Indicating in Flight Compartment
(Ref. Fig. 005)
(Ref. Fig. 006)

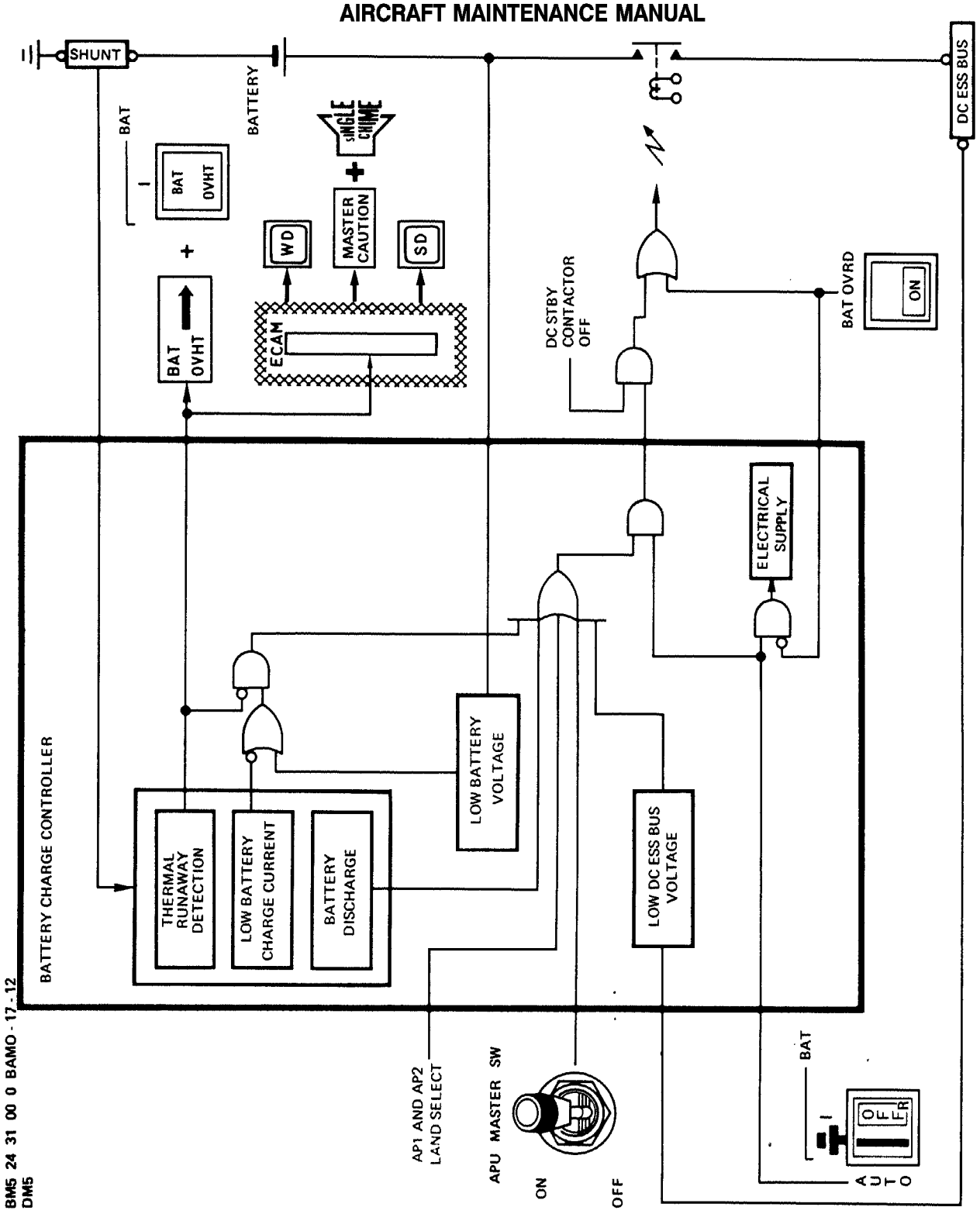
A. Standby Generator Configuration
The operation of the standby generator is controlled from the flight compartment overhead panel by means of **ELEC PWR/STBY GEN** pushbutton switch with two stable positions :
- **AUTO** : the pushbutton switch is released (out) ; standby generator coupling and uncoupling are automatically controlled.
- **OVRD** : the pushbutton switch is pressed (in) ; the standby generator is manually started, the **OVRD** legend comes on white.

The **FAULT** legend on the **STBY GEN** pushbutton switch comes on amber to indicate failure of the standby generator operation.

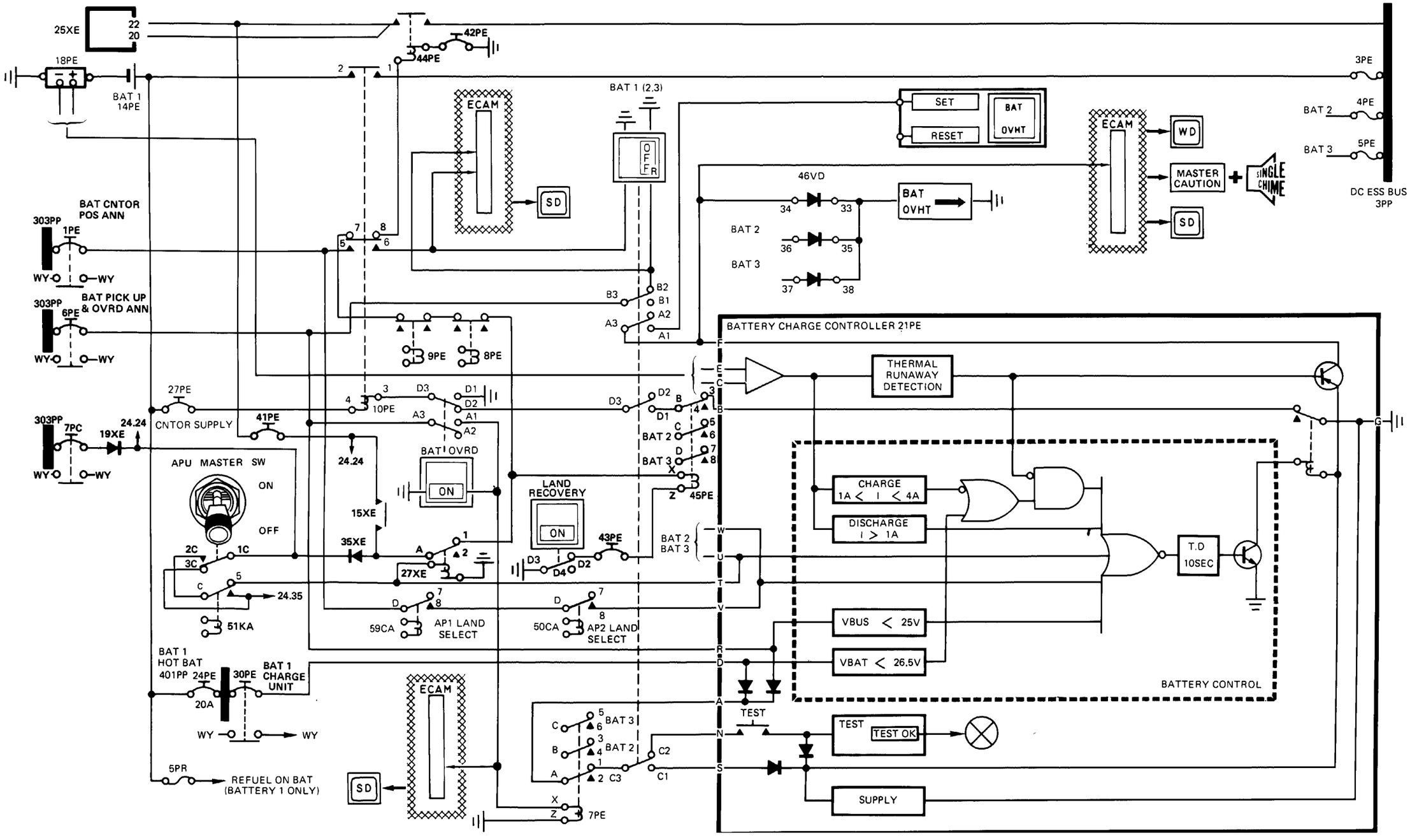
B. Battery Configuration
(1) The operation of each battery/charge controller is controlled from the flight compartment overhead panel by means of **ELEC PWR/BAT1** (2 or 3) pushbutton switch with two stable positions :
- **OFF/R** : the pushbutton switch is released (out) : the battery/charge controller is not operating and the battery is uncoupled from the network.
  The position of this control is indicated by illumination in white of the corresponding legend.
- **AUTO** : the pushbutton switch is pressed (in) : the battery/charge controller assembly is operating. The battery coupling and uncoupling are automatically controlled by the charge controller.
  The battery contactor position is indicated by the configuration of the flowbar on the pushbutton switch (on or off).

(2) A second **ELEC PWR/BAT OVRD** pushbutton switch with two stable positions enables overriding of the preceeding control (either **AUTO** or **OFF/R** position) and imposes coupling of the three batteries.
The **ON** position of this control, pushbutton switch pressed, is indicated by the illumination in white of the corresponding legend.
NOTE : - This control must only be used in emergency configuration.
- It isolates the charge controller and inhibits thermal runaway detection.

(3) **ELEC PWR/BAT OVHT** amber warning light, with corresponding warning on the **ECAM** system comes on in case of thermal runaway detected on one of the three batteries.
The warning can be cancelled by switching the control of the faulty battery to **OFF/R**.
NOTE : The faulty battery is also automatically isolated by the detection circuit.
The thermal runaway is also indicated for each battery on the maintenance panel by the corresponding **ELEC PWR/BAT OVHT** memorized fault annunciator (**MFA**).



DC Generation by Standby Generator or by Batteries - Control and Indicating
Figure 005



BM5 24 31 00 0 BCQO - 00

DC Generation by Standby Generator or by Batteries -
Control and Indicating Schematic
Figure 006

4. Standby Generator

The DC source supplied to the standby generator is obtained from a delta connected three-phase armature connected to a rectifier bridge made up of six diodes.

Main characteristics :

- Nominal power : 50 A at 28 V
- Voltage not regulated

R at distribution busbars : 24 to 31.5 V

- Overload : 100 A at 22 V during 1 second.

5. Batteries

Each battery of the nickel-cadmium type, is composed of twenty elements series mounted and housed in a stainless steel container.
Its electrolyte reserve is twice as much as that of a standard battery.

A. General Characteristics

- Reference : SAFT, type 2520
- Nominal voltage : 24 volts
- Nominal capacity : 25Ah
- Electrolyte : potassium hydroxide solution with a consumable reserve of 60 cm^3 per element.

B. Charge Controller

The charge controller enables
- by controlling the battery contactor
  . control of the battery charge from the aircraft network
  . the automatic recovery of the network in case of loss of its supply
  . an automatic response to external orders, in particular configurations (AP, APU)
- detection and indication of a thermal runaway.

A test circuit enables checking of its main functions.
The charge controller supply is provided both by the aircraft network and the associated battery by means of the general controls located on the overhead panel of the flight compartment.

(1)Battery Contactor Control

(Ref. Fig. 007)

(a)The three batteries are automatically and simultaneously connected :
- in the event of network voltage drop
- during APU starting to ensure identical operation of the three battery/charge controllers
- when LAND mode is selected on both autopilots, to increase the reliability of the system during a category III automatic landing.

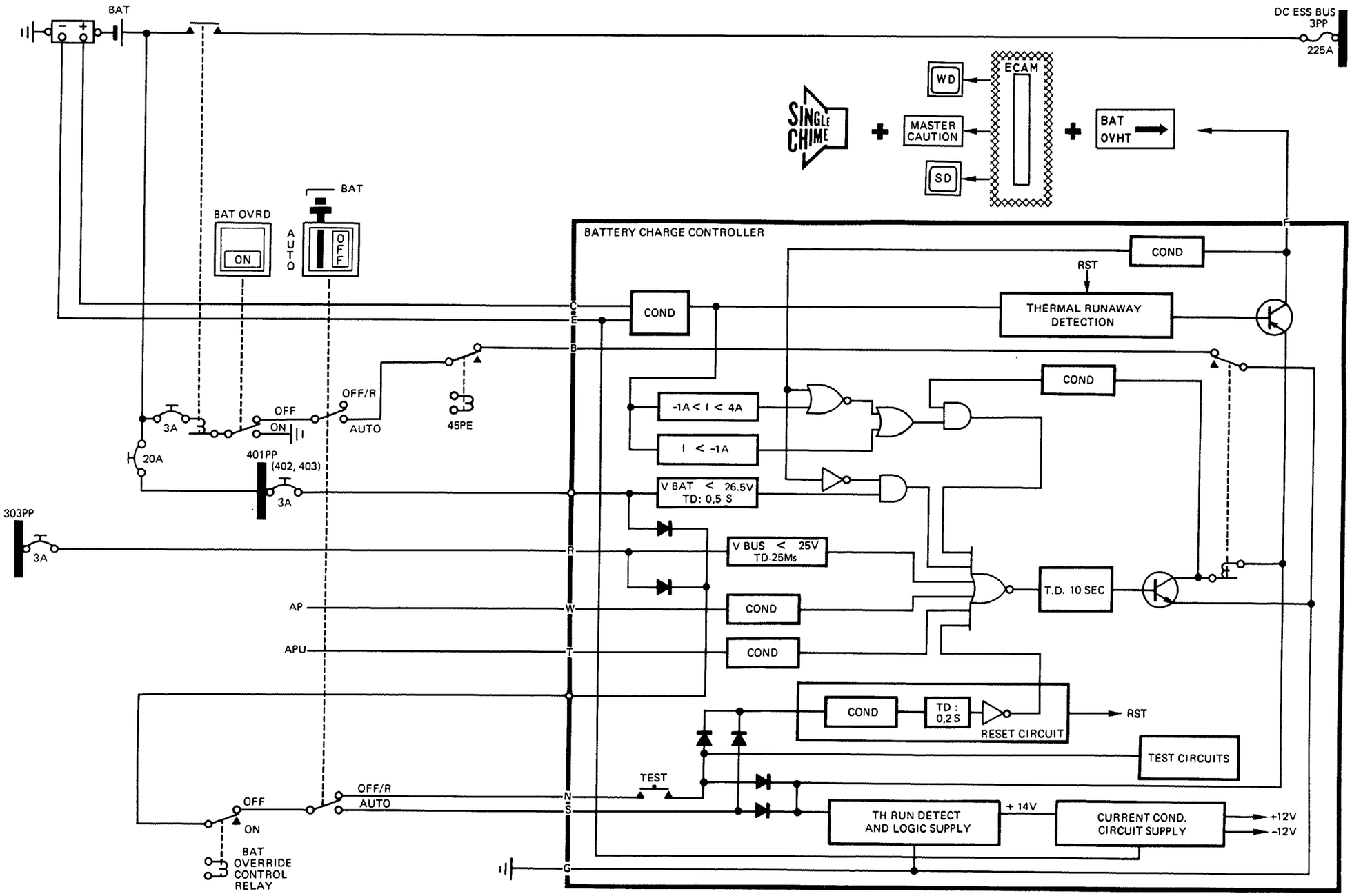
(b)When the system control is moved from OFF/R to AUTO this initially imposes battery coupling. The battery then absorbs a charge current which decreases with time (see detail A) (Ref. Fig. 008)
When the charge current is sufficiently low (Ich < 4 A), the battery is considered as charged and is automatically uncoupled.
The voltage at the terminals then slowly decreases with time and provided the no load voltage reaches a certain threshold (V bus < 26.5 V), the battery is automatically recoupled for an additional charge.
The battery will be uncoupled again for a low charge current, etc...

(c)When a thermal runaway is detected by the controller, the battery is automatically uncoupled from the network.

(2)Thermal Runaway Detection

(Ref. Fig. 009)

This detection is performed when there is an increase of the battery charging current : (see detail B) (Ref. Fig. 008).
- the charge current is read and memorized every minute
- if the charge current is higher than the one read previously by a preset increment, the information is recorded by a three stroke counter
- if this increment is exceeded three times successively, the OVHT



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DC Generation by Batteries - Battery Charge Controller
Figure 007

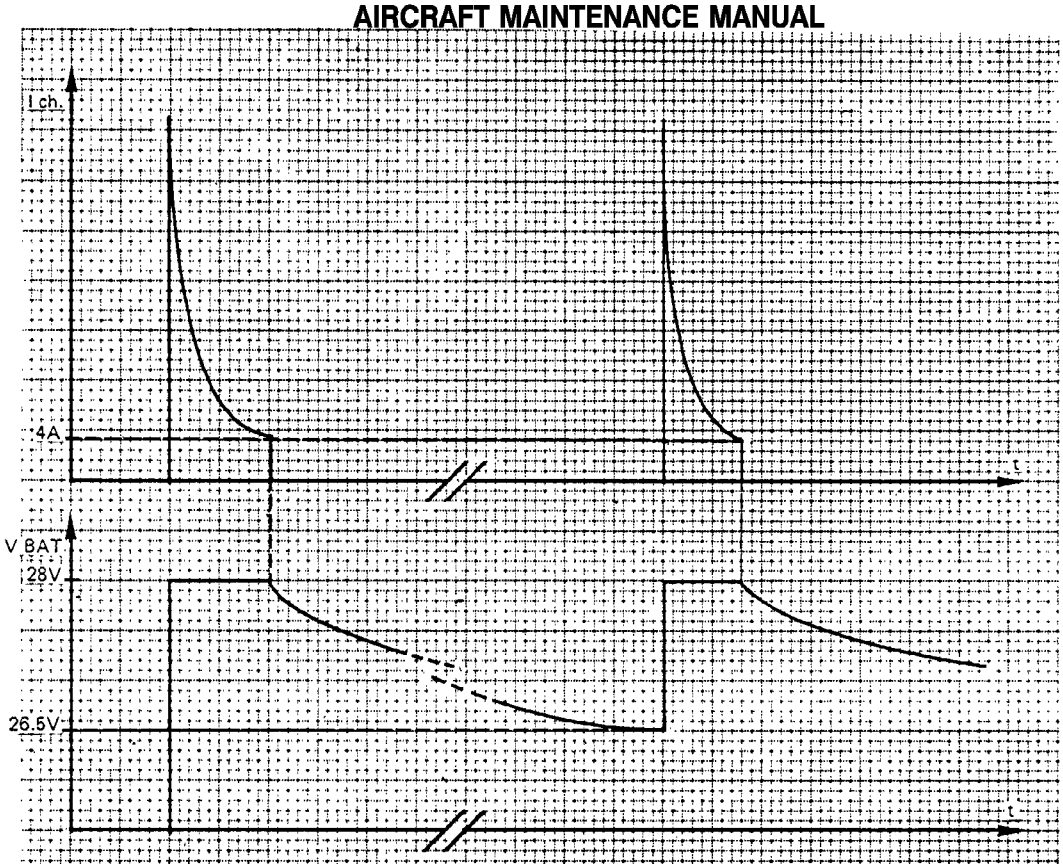

FIG. A - CHARGE MONITORING PRINCIPLE

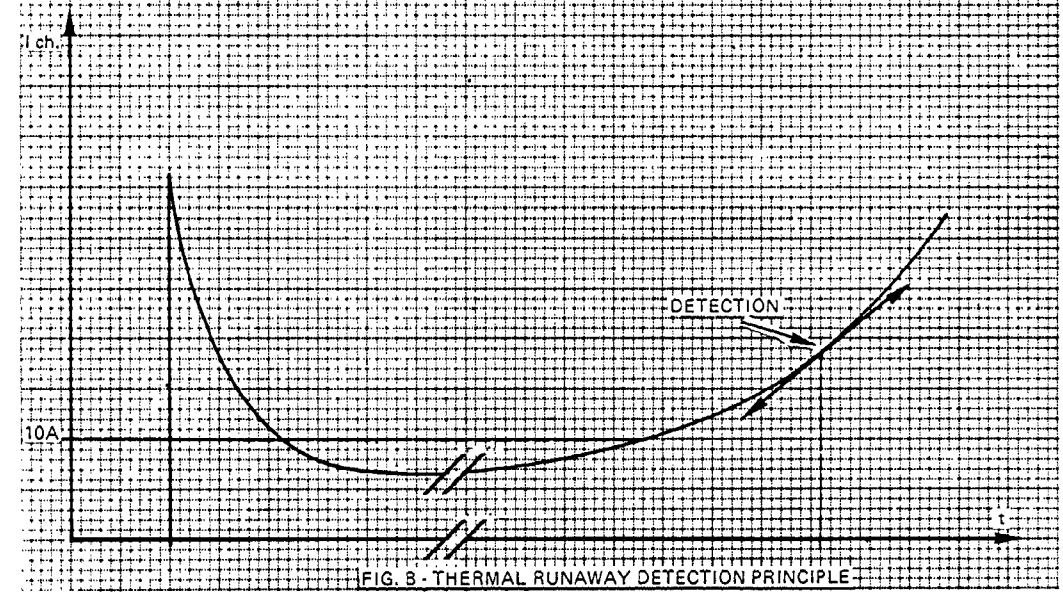

FIG. B - THERMAL RUNAWAY DETECTION PRINCIPLE

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DC Generation by Batteries - Battery Charge Controller
Figure 008

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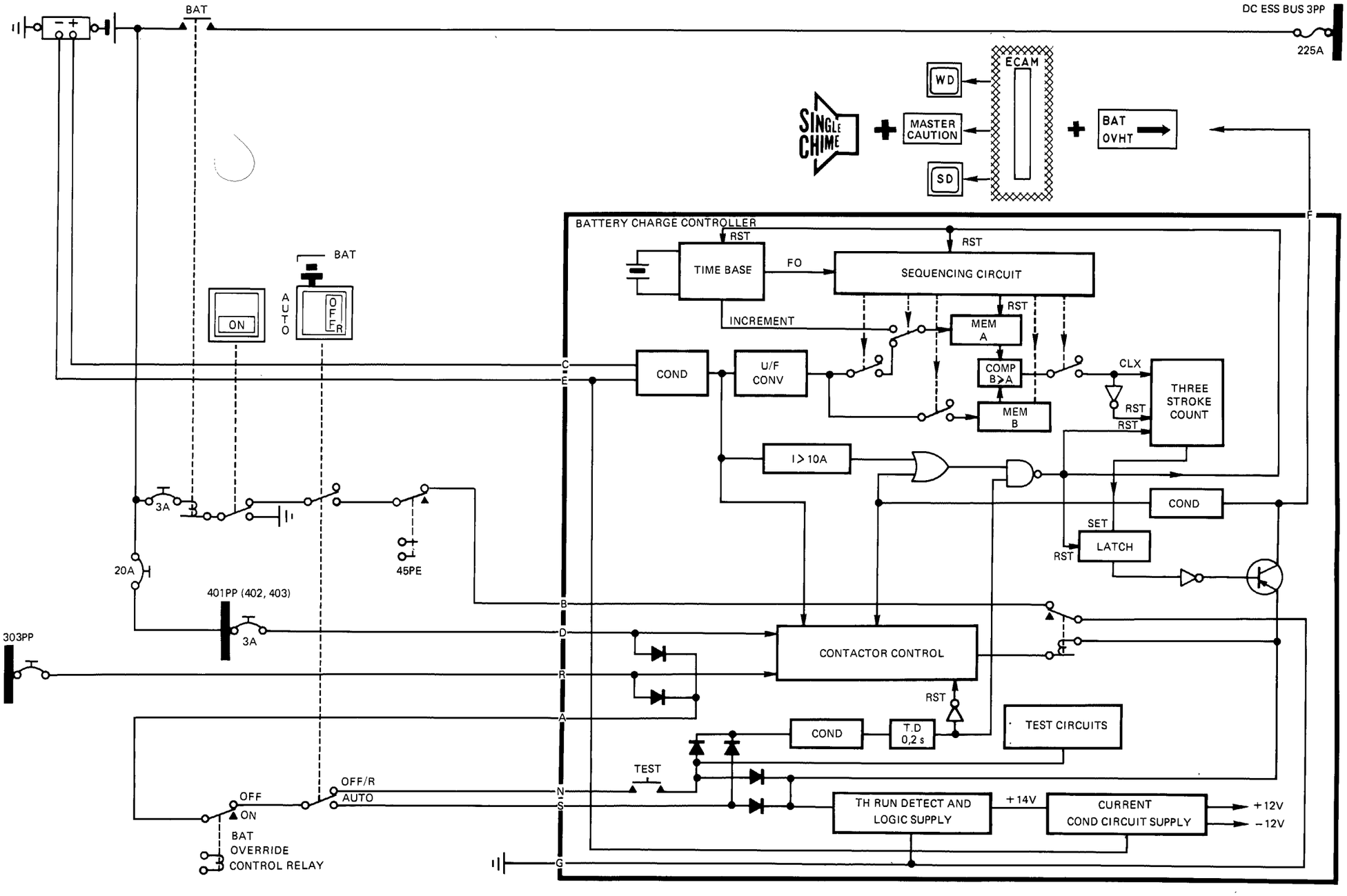

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DC Generation by Batteries - Battery Charge Controller - Thermal Runaway Detection
Figure 009

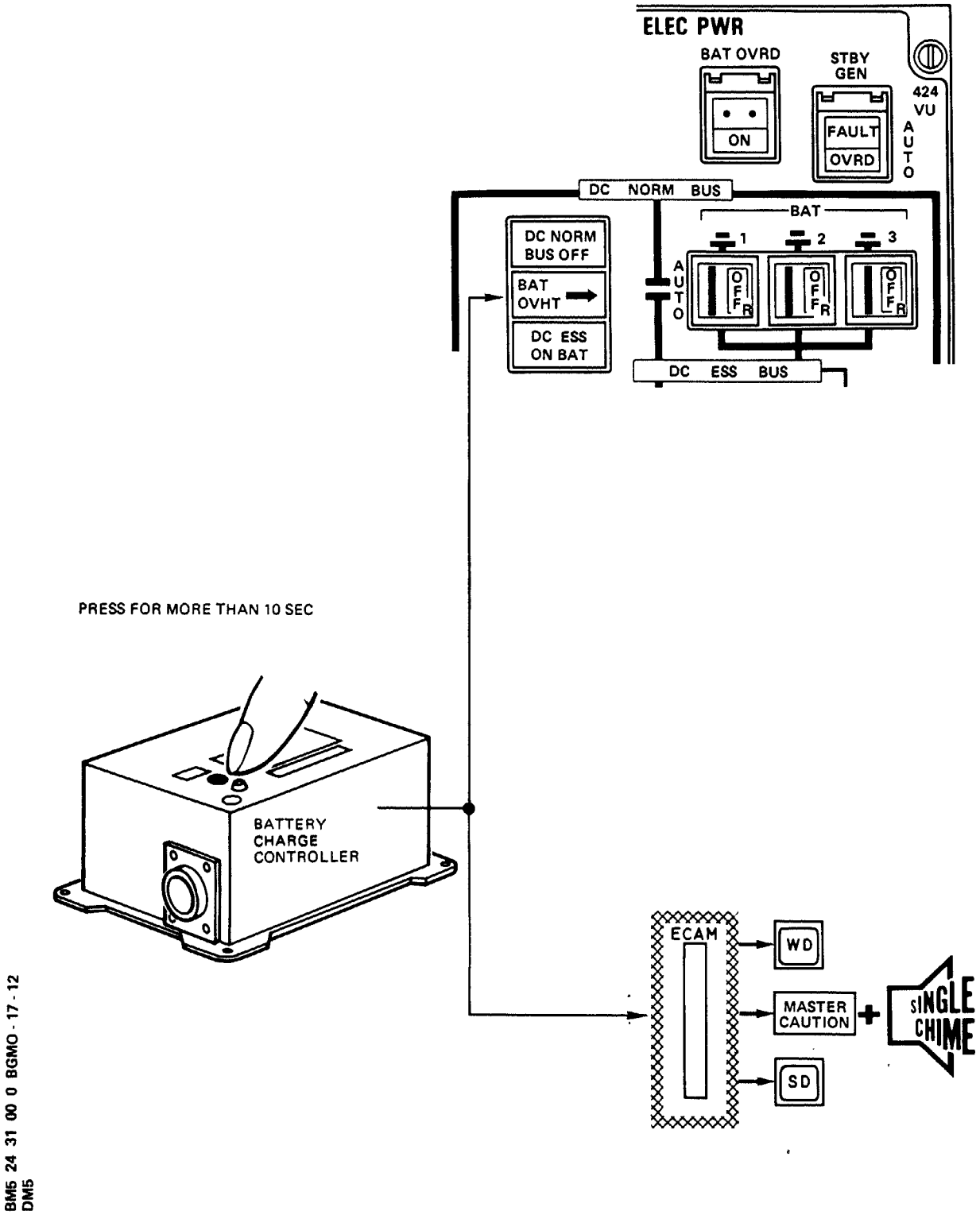
warning is triggered.
This detection is performed numerically.
The current information is conditioned, then transformed by a voltage/ frequency converter into a pulse train the frequency of which is representative of the charge current value.
The processing of this current information is controlled by a sequencing circuit, itself piloted by a time base (frequency FO).
The sequencing circuit controls the following cycle of operations :
- resetting to zero of memory A
- storage in memory A of the present value of the current
- incrementation of memory A of a value corresponding to the threshold of the detection to be performed (0.375A ± 0.1A)
- 56 seconds delay
- resetting to zero of memory B
- storage in memory B of the present value of the current and comparison with the value previously stored in memory A.
- the information provided by the comparator is taken into account by the three stroke counter
  . it is recorded if B ≥ A
  . it is reset to zero if B < A
- end of the cycle, beginning of the next one.

When the counter has recorded increasing values, three times successively,
- the overheat warning is triggerred and self-held
- ten seconds after, the battery is isolated from the network by means of its contactor control circuit.

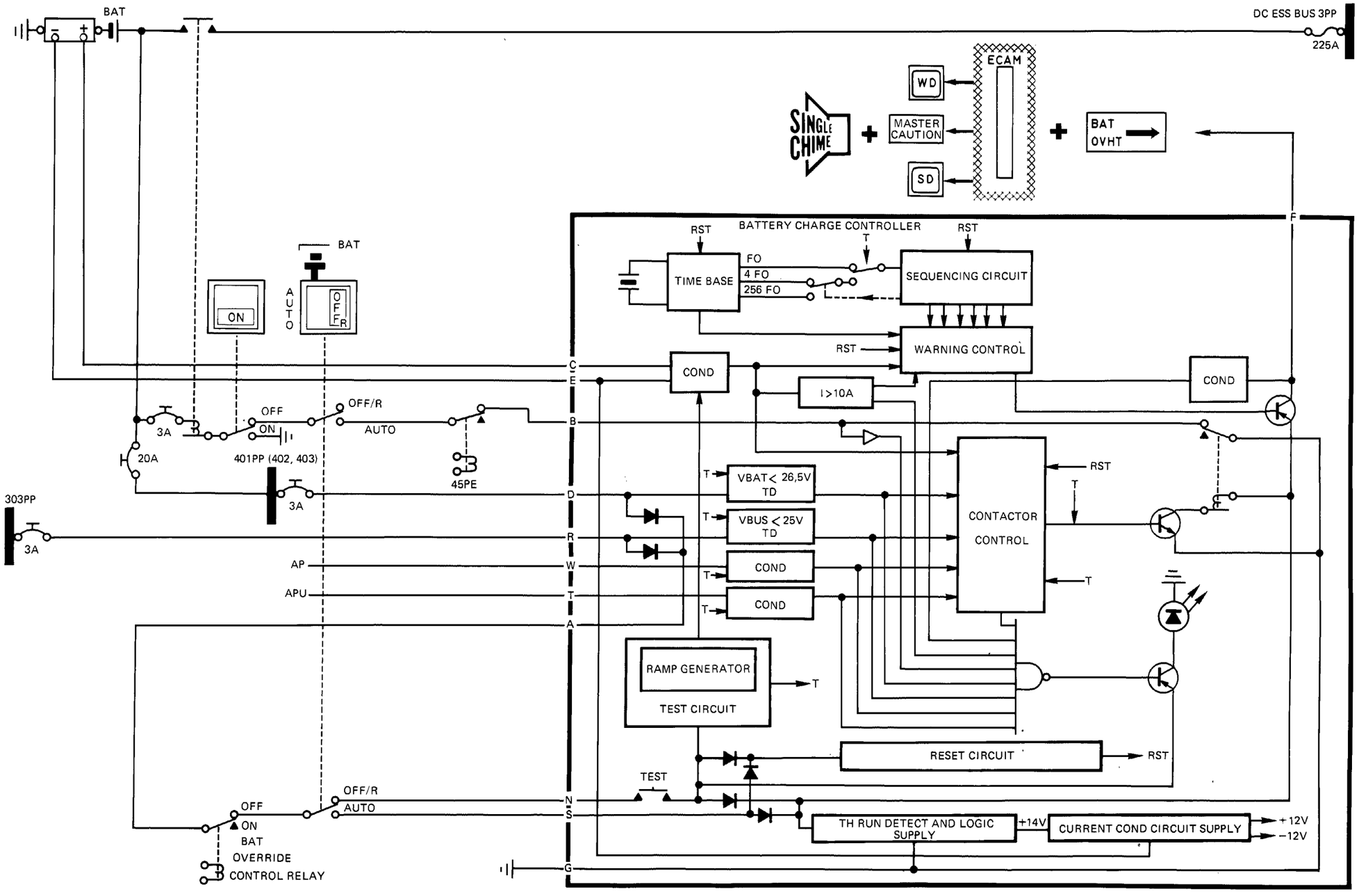
NOTES : - the detection assembly (time base, sequencing circuit, three stroke counter, warning control) is reset when the charge controller is energized (ELEC PWR/BAT pushbutton switch selection from OFF/R to AUTO)
- its operation is inhibited (RST) when the charging current is lower than 10A ± 1A, except after detection and activation of the overheat warning
- it should be noted that each step of a cycle controlled by the sequencing circuit lasts one second.

(3)Test
(Ref. Fig. 010)
(Ref. Fig. 011)
Each controller has an internal test facility which checks its main functions (thermal runaway detection, charge control,...)
- with ELEC PWR/BAT 1 (2 or 3) and ELEC PWR/BAT OVRD pushbutton switches in the flight compartment in OFF position.
- by pressing momentarily, for ten seconds approximately, TEST pushbutton switch on the controller.

A warning light adjacent to this pushbutton switch comes on approximately ten seconds after to indicate a correct operation of the controller.
When TEST pushbutton switch is pressed :
- the controller is supplied, a general resetting is carried out,
- stimuli are sent to
  . conditioning circuits of the external information (busbar voltage, battery voltage, AP, APU)



DC Generation by Batteries - Battery Charge Controller - Test
Figure 010



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DC Generation by Batteries - Battery Charge Controller - Test
Figure 011

. logic circuits and the internal relay controlling battery contactor
- a ramp input is simulated via the conditioning circuit of the battery shunt signal.

If the reaction of the stimulated circuits is correct and a thermal runaway detected, the BAT OVHT warning light located on ELEC PWR section of overhead panel comes on. However, the operation of the BAT OVHT memorized fault annunciator (MFA) located on the maintenance panel is inhibited.
More particularly and as far as the thermal runaway detection is concerned
- the two states of the 10A comparator (< 10, > 10) are checked
- the cycle controlled by the sequencing circuit is accelerated as follows :
  . the duration of each step is reduced from one second to TBD (time base frequency X FO)
  . the 56 second delay between two current measurements is reduced to TBD seconds (time base frequency X FO).

It should be noted that this test also enables checking of the battery shunt-to-charge controller connecting wiring.

(4)Recovery of the network
The charge controller monitors the network voltage permanently. If this voltage drops below a certain level (V bus < 25V), the battery is automatically connected for network recovery.
When the battery discharges (I disch > 1A), it is maintained on line in any other control condition of its contactor.

(5)External orders
Battery coupling is imposed by orders such as
- APU (starting)
- AP (selection of the LAND mode on both autopilots)

(6)Priority of the various contactor controls
The table below gives, in order of priority, the control orders of the battery contactor according to the various information analyzed

Information	Threshold and Delay	Contactor Control
1. BAT control with AUTO selected		Closing
2. V bus (Busbar voltage) or AP or APU	V Bus < 25V ± 0.2 V Time delay 25ms ± 5ms	Closing
3. Battery discharge	I disch. current > 1A ± 0.5A	Closing
4. Thermal runaway		Opening
5. V Bat (Battery voltage)	V Bat < 26.5V ± 0.1V Time delay 0.5s ± 50ms	Closing
6. Low charge current	1A ± 0.5A < I ch. < 4A ± 1A	Opening

NOTE : The actual opening of the battery contactor happens with a delay of 10 seconds ± 2 seconds after the end of an automatic closing order or the beginning of an automatic opening order.

6. Selection of Power Supply Mode

A. In Flight

(1) In case of loss of the three AC sources, power supply from the standby generator enables aircraft autonomy without time limitation. This power supply is automatically selected and has priority on the batteries.
The network is recovered by the batteries in the following cases :
- Faulty operation of the standby generator (FAULT legend on STBY GEN pushbutton switch is on).
- APU autonomous start-up considering the high value reached by the DC inrush current at start-up, the standby generator only supplies the AC network its DC network is uncoupled.
Busbar 3PP is recovered by the batteries.
- LAND RECOVERY
Considering the high consumption of DC by the equipment supplied during this procedure, essential busbar 3PP is recovered by the batteries (the standby generator supplies the AC network only).
- Action on BAT OVRD pushbutton switch on ELEC PWR section of panel 424VU.

R (2) In case of loss of the DC ESS network, power supply from the batteries is automatically selected and a message is displayed on the left ECAM display unit calling for standby generator coupling.
Coupling is performed manually by action on STBY GEN pushbutton switch located on ELEC PWR section of panel 424VU ; batteries are thus automatically uncoupled.

B. On ground

Power supply from the batteries is automatically selected ; only manual control by action on STBY GEN pushbutton switch enables power supply from the standby generator.

BATTERY - DC GENERATION - REMOVAL/INSTALLATION

1. Battery Contactor

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Warning Notices
Referenced Procedures	
- 24-31-00, P. Block 501	Batteries - DC Generation
- 24-31-11, P. Block 401	Batteries - Removal/Installation
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure

(1) Job set-up

(a) Open access door 121BL.

(b) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(c) Make certain that electronics racks ventilation is correct.

(d) In flight compartment, on overhead panel 424VU, release BAT pushbutton switches and install a warning notice prohibiting actuation of BAT 1, 2, 3 pushbutton switches.

(e) Open, safety and tag the following circuit breakers :

R 1 For battery 3 contactor 8PE.

R PANEL	SERVICE	IDENT.	LOCATION
R 22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
R 281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A6
R 106VU	CNTOR-DC STANDBY	42PE	UPPER PART
R 106VU	ESS TR CURRENT SNSR & CNTOR RETURN	18PC	UPPER PART

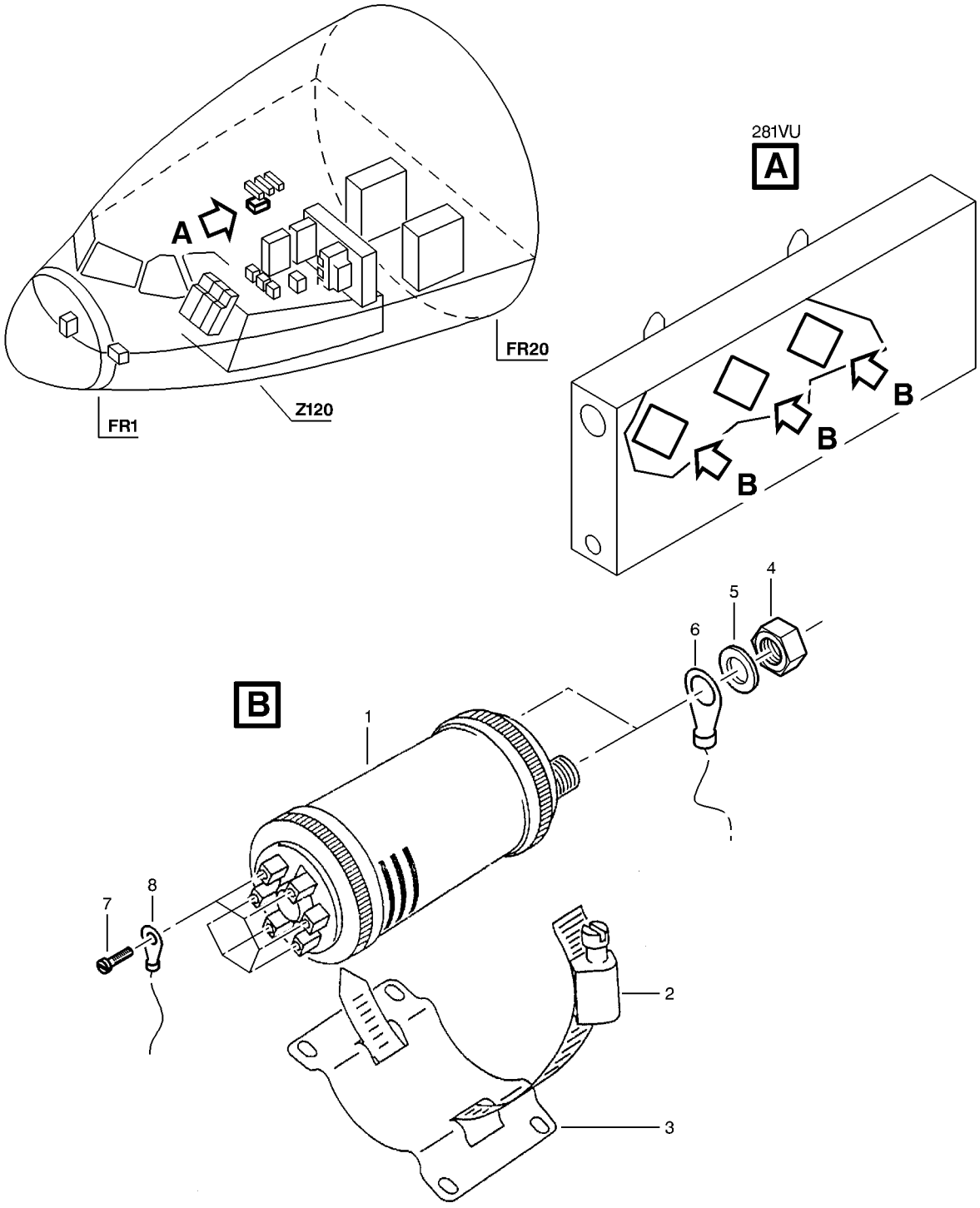
R 2 For battery 2 contactor 9PE.

R PANEL	SERVICE	IDENT.	LOCATION
R 22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
R 281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A4
R 106VU	CNTOR-DC STANDBY	42PE	UPPER PART
R 106VU	ESS TR CURRENT SNSR & CNTOR RETURN	18PC	UPPER PART

R 3 For battery 1 contactor 10PE.

R PANEL	SERVICE	IDENT.	LOCATION
R 22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
R 281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A2
R 106VU	CNTOR-DC STANDBY	42PE	UPPER PART
R 106VU	ESS TR CURRENT SNSR & CNTOR RETURN	18PC	UPPER PART

R (2)Removal (Ref. Fig. 401)
(a)Disconnect the electrical connector from battery
(Ref. 24-31-11, P. Block 401).
(b)Disconnect the electrical wires (6) from the battery contactor (1).
1 Remove the two nuts (4) and the two washers (5).
2 Disconnect the two electrical wires (6).
3 Install insulating sleeves on the cable lugs.
(c)Disconnect the electrical wires (8) from the battery contactor (1).
1 Remove the six screws (7) from the contactor (1).
2 Disconnect the six electrical wires (8).
3 Install insulating sleeves on the cable lugs.
(d)Remove the contactor battery (1).
1 Remove the clamp (2) from the battery contactor (1) and the base (3).
2 Remove the battery contactor (1).
(3)Installation
(a)Install the battery contactor (1).
1 Put the battery contactor in position on the base (3).
2 Install the clamp (2) on the base (3) and tighten it with the battery contactor.
(b)Connect the electrical wires (6) to the battery contactor (1).
1 Remove the insulating sleeves from the cable lugs.
2 Connect the two electrical wires (6).
3 Install the two washers (5), the two nuts (4) and tighten.
(c)Connect the electrical wires (8) to the battery contactor (1).
1 Remove the insulating sleeves from the cable lugs.
2 Connect the six electrical wires (8).
3 Install the six screws (7) and tighten.
(d)Connect the electrical connector of battery
(Ref. 24-31-11, P. Block 401).
R
R (e)Remove safety clips and tags and close circuit breakers 1PE, 27PE,
R 28PE, 29PE, 42PE and 18PC.
(4)Test
(a)Perform an operational Battery charge controller bite test
(Ref. 24-31-00, P. Block 501)
(5)Close-up
(a)Make certain that the BAT pushbutton switches are released.
(b)Close access door 121BL.
(c)Remove warning notices.
(d)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).



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Battery Contactors
Figure 401

1. Operational Test

A. Reason for the Job

R (1)Check of battery charge controller BITE test.
(2)Check of battery override test.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job Set-Up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 1	30PE	206/D24
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 2	31PE	206/D25
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 3	32PE	206/D26
132VU	LIGHTING/INTERIOR LT/DIGIT	225LF	321/P79
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A 1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A 2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A 3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A 4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A 5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A 6

(c)On panel 424VU make certain that :
- BAT1, 2 and 3 pushbutton switches are released out (OFF legend is on)
- BAT OVRD pushbutton switch is released out.

(d)Make certain that ECAM circuit breakers are closed, activate the ECAM system and select DC page.

R (2)Test of each of the three battery charge controller BITE test

ACTION	RESULT
(1)On battery charge controller - press test button for approximately 15 sec, then release.	On battery charge controller - after 10 sec maximum, test light comes on. On panel 424VU - after 10 sec, BAT OVHT warning light comes on. On CAPT and F/O main instrument

ACTION	RESULT
	panels 3VU and 5VU - MASTER CAUTION lights come on, accompanied by the single chime. To go off, the MASTER CAUTION lights have to be manually resetted. On the L ECAM display unit - BAT OVHT.....OFF/R appears.

(3)BAT OVRD test

ACTION	RESULT
(1)On panel 424VU - press BAT OVRD pushbutton switch	On panel 424VU - ON legend of BAT OVRD pushbutton switch comes on - the flowbar of the three BAT pushbutton switches comes on (OFF legend remains on). On the R ECAM display unit - check that batteries are correctly coupled to ESS BUS busbar.
- press and release BAT OVRD push-button switch	On panel 424VU - ON legend of BAT OVRD pushbutton switch goes off - the flowbar of the three BAT pushbutton switches goes off (OFF legend remains on). On the R ECAM display - check that batteries are uncoupled from ESS BUS.

(4)Close-up
De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test

A. Reason for the Job
Check operation of the charge controller receiving external data.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 29-21-00, P. Block 301	Green Auxiliary Power

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Pressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).
(c)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 1	30PE	206/D24
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 2	31PE	206/D25
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 3	32PE	206/D26
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A 1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A 2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A 3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A 4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A 5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A 6

(d)Make certain that the ECAM circuit breakers are closed, activate the ECAM system and select ELEC DC page.
(e)Align IRS (on overhead panel, on MSU 1, 2, 3 Align Mode warning light off).
(f)On panel 424VU
- make certain that BAT pushbutton switches are released out (OFF legend on)
- make certain that BAT OVRD is released out.

(g)On panel 425VU
- place ELEC IND DC selector switch in BAT 1, 2 or 3 position.

(2)Test
NOTE : When conducting this test the batteries are supposed charged.

ACTION	RESULT
(1)On each of the three battery charge controllers - press test button for approximately 15 sec, then release.	On each of the three charge controllers - after 10 sec maximum, test light comes on. On panel 424VU - after 10 sec, BAT OVHT warning light comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on, accompanied by the single chime. To go off, the MASTER CAUTION lights have to be manually resetted. On the L ECAM display unit the

ACTION	RESULT
	following messages appear : - **BAT OVHT** - **BAT ----------OFF/R**
(2)On panel 424VU - press the three **BAT** pushbutton switches	On panel 424VU - **OFF** legend of these pushbutton switches go off, the flowbar comes on. On panel 425VU - check battery conditions and charge currents. On **R ECAM** display unit - check conformity with panels 424VU and 425VU.
(3)After a delay of between 1 and 20 min (depending on the initial charge of the battery)	On panel 424VU - the flowbar of **BAT** pushbutton switches must go off. On panel 425VU - check battery conditions - the charge currents must be null. On the **R ECAM** display unit - check conformity with panels 424VU and 425VU.
(4)On panel 424VU - press **BAT OVRD** pushbutton switch.	On panel 424VU - **ON** legend of **BAT OVRD** pushbutton switch comes on - the flowbar of the three **BAT** pushbutton switches comes on. On the **R ECAM** display unit - check that batteries are correctly coupled to **ESS BUS** busbar
- press and release **BAT OVRD** push-button switch	On panel 424VU - **ON** legend of **BAT OVRD** pushbutton switch goes off - the flowbar of the three **BAT** pushbutton switches goes off. On the **R ECAM** display unit - check that batteries are uncoupled from **ESS BUS** busbar
(5)On panel 429VU, **APU** section - place **MASTER SW** in **ON** position	On panel 424VU - the flowbar of the three **BAT** pushbutton switches comes on. On the **R ECAM** display unit - check conformity with the indications of panels 424VU and 429VU (battery coupling).
- place **MASTER SW** in **OFF** position.	On panel 424VU

ACTION	RESULT
	- the flowbar of the three BAT pushbutton switches goes off (approx. 25 sec after).
(6)Apply hydraulic power to GREEN, BLUE and YELLOW hydraulic systems. WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, MAKE CERTAIN THAT HYDRAULIC SYSTEMS UNDER MAINTENANCE HAVE BEEN ISOLATED AND THAT CONTROL SURFACES ARE CLEAR	
(7)On panel 426VU - place both PITCH TRIM and both YAM DAMPER levers in ON position:	On panel 426VU - PITCH TRIM and YAM damper levers remain in ON position.
(8)On panel 13VU - place AP 1 engage lever in ON position. - press CWS/CMD pushbutton switch.	On panel 13VU - AP 1 lever remains in ON position. - green CWS comes on. On panels 3VU and 5VU, on PFD's - amber CWS 1 indicator appears. On panel 13VU, on CWS/CMD pushbutton switch - green CWS light goes off. - green CMD light comes on. On panels 3VU and 5VU, on PFD's - white CMD indication appears. - amber CWS 1 indication disappears.
(9)On panel 13VU - press and release LAND pushbutton switch.	On panel 13VU - green bars in LAND pushbutton switch are illuminated.
(10)On panel 13VU - place AP 2 engage lever in ON position.	On panel 13VU - AP 2 lever remains in ON position. On panel 424VU - the flowbar of the three BAT pushbutton switches comes on. On the R ECAM display unit - check conformity with the indications of panel 424VU (battery coupling).
(11)On Captain's control wheel - disengage autopilot and cancel warning.	On panel 424VU - the flowbar of the three BAT push-button switches goes off (approx. 25 sec after).
(12)On panel 424VU - press and release (out) the	On panel 424VU - OFF legend of the three BAT

ACTION	RESULT
three BAT pushbutton switches.	pushbutton switches comes on.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Depressurize Green hydraulic system (Ref. 29-21-00, P. Block 301).

1. Reason for the Job

A. Visual check of the batteries

B. Check of the ventilation ducts

C. Cleaning of the battery area in case of spillage

2. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notice
C.	Acetic Acid, 5% Solution
Reference Procedures	
- 24-31-11, P. Block 401	Batteries
- 24-42-00, P. Block 301	Ground Service Bus Control

3. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-42-00, P. Block 301).
(2)Open safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A6

(3)In zone 144
(a)Open door 144DR
(b)On panel 110VU
- position a warning notice prohibiting the use of PWR SUPPLY /NORM/ BAT switch.

B. Visual Check of Batteries
(1)External check of the battery.
Check the following for correct condition :
- case and lid
- latches
- pins of electrical connector.
(2)Internal check of the battery.
Remove battery lid and check condition of :
- cells (electrolytic spillage, overheating, deformation)

- connections between cells (oxidation)
- safety valves.

(3)In case of electrolyte spillage, overheat or deformation noted, remove battery (Ref. 24-31-11, P. Block 401) for cleaning and restoration to correct operating condition.

C. Check of the Ventilation Ducts

(1)Remove battery (Ref. 24-31-11, P. Block 401)
(2)Check condition of ventilation ducts (traces of electrolyte)
(3)If necessary remove ducts to clean and wash them with water to remove electrolyte.

D. Cleaning of the Battery Aera

CAUTION : IN THE EVENT OF SKIN BECOMING CONTAMINATED WITH ELECTROLYTE, IMMEDIATELY WASH THE AFFECTED AREA COPIOUSLY WITH CLEAN COLD WATER. SHOULD EYES BECOME AFFECTED, FLUSH IMMEDIATELY WITH CLEAN COLD WATER, IN EITHER EVENT, REPORT IMMEDIATELY TO THE NEAREST OCCUPATIONAL HEALTH UNIT FOR SPECIALIST MEDICAL ATTENTION.

(1)In areas easily accessible
- use a clean wet cloth to remove any trace of electrolyte, taking care not to spread electrolyte.
The cloth must often be rinsed not to increase the contaminated area.

(2)In areas not easily accessible (complex structure)
(a)Rinse first the area with a 5% acetic acid solution
NOTE : If acetic acid is not available, pure household spirit vinegar may be used in replacement.
(b)Then wipe and dry the area as well as possible with a clean cloth.

(3)For electrical cables contaminated by electrolyte :
(a)Clean cables with a clean wet sponge or cloth.
(b)If cable insulation is damaged, replace cable.

(4)In any case of electrolyte spillage, a report must be written to describe the area involved, the type of cleaning and the cable repair carried out so that the area may be checked again 14 days after.

E. Close-Up

(1)Remove safety clips and tags and close circuit breakers 24PE, 25PE, 26PE, 27PE, 28PE and 29PE.
(2)In zone 144
(a)On panel 110VU
- Remove warning notice.
(b)Close access door 144DR.
(3)De-energize the aircraft electrical network (Ref. 24-42-00,P. Block 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notice
C.	Blanking Plugs/Caps
R D.	Copper Shear Wire NFL23-321
Referenced Procedures	
- 24-31-00, P. Block 501	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set-Up
(1)Open access door 811.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)In flight compartment, on overhead panel 424VU release BAT pushbutton switches and install a warning notice prohibiting actuation of Bat 1, 2, 3.
(5)Open, safety and tag the following circuits breakers.

PANEL	SERVICE	IDENT.	LOCATION
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A6

B. Removal (Ref. Fig. 401)
NOTE : During removal/installation of battery 1 do not refuel aircraft on batteries.
(1)Remove battery protection fabric.
(2)Disconnect the front ventilation duct coupling (8) by pulling on coupling ring (7) to free locking ball (9) (Ref. Detail C).
R (3)Disconnection of electrical connector :
R - If installed, cut and remove copper shear wire between knurled nut (11)
R and electrical connector (5).
R - Disconnect electrical connector (5).
(4)Loosen the two lock screws (4) securing attach fitting.
(5)Pull down attach fitting to free battery attachment lugs (12).
(6)Slide battery along rack to free rear ventilation duct coupling (3) and centering pins (1).
(7)Remove battery.
CAUTION : IF THE NEW BATTERY CANNOT BE MOUNTED IMMEDIATELY, TAKE PRECAUTIONARY MEASURES TO PREVENT FOREIGN MATTER FROM ENTERING THE

VENTILATION DUCT COUPLINGS.

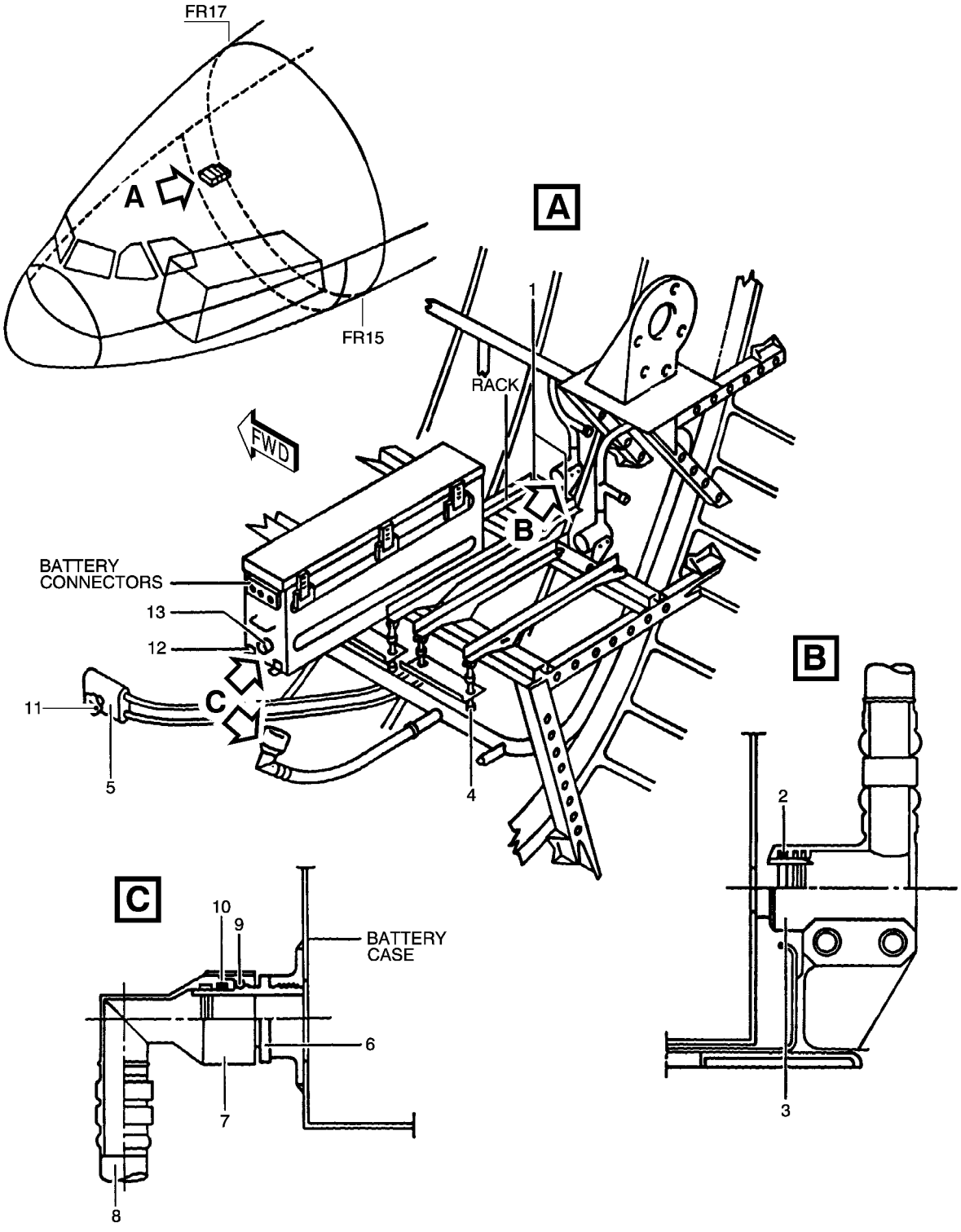
(8)Check for leakage of electrolyte into ventilation ports (13) and ducts (8).
(9)If electrolyte leakage is detected, remove contamined ducts for cleaning and washing with water.

C. Preparation of Replacement Component
Make certain that replacement battery is fitted with special union (6) for connection to the ventilation duct (Ref. detail C). If necessary, take the union from the removed battery.

D. Installation
(1)Make certain that O-ring (2) is correctly installed in rear fixed ventilation duct coupling (3) (Ref. detail B).
(2)Make certain that O-ring (10) is correctly installed in front ventilation duct coupling (7) (Ref. detail C).
(3)Slide battery along mount.
(4)Make certain that battery ventilation duct coupling engages correctly with fixed coupling (3) and that centering pins (1) fit into their recesses (Ref. detail B).
(5)Position attach fitting and tighten lock screws (4).
(6)Connect front ventilation duct coupling (7) to fixed coupling, fitting the latter into the former until the coupling ring is locked by ball (9).
R (7)Connection of electrical connector :
R - Connect electrical connector (5).
R - If there is a hole on knurled nut (11) and on electrical connector (5),
R install COPPER SHEAR WIRE NFL23-321.
(8)Remove safety clips and tags and close circuit breakers 24PE, 25PE, 26PE 27PE, 28PE and 29PE.

E. Test
(1)Perform an operational battery charge controller bite test (Ref. 24-31-00, P. Block 501).
(2)Perform an adjustment of the clocks, if necessary (Ref. AMM 31-21-00, P. Block 501).
NOTE : For the following cases :
(1)Either the battery has been removed from the clock.
(2)Or the clock do not have an internal battery.

F. Close-Up
(1)Make certain that BAT pushbutton switches are released.
(2)Replace battery protection fabric.
(3)Close access door 121BL.
(4)Remove warning notices.
(5)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).



Battery Installation
Figure 401

R

BATTERY CHARGE CONTROLLER - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notices
Referenced Procedures	
- 24-31-00, P. Block 501	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set-Up
(1)Open access door 121BL.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)In flight compartment, on overhead panel 424VU release BAT pushbutton switches and install a warning notice prohibiting actuation of BAT 1,2,3.
(5)Open, safety and tag the following circuit breakers :
(a)For battery 1 charge controller 21PE.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELECT/BAT/CHARGE UNIT/& V IND/BAT 1	30PE	206/D24

(b)For battery 2 charge controller 22PE.

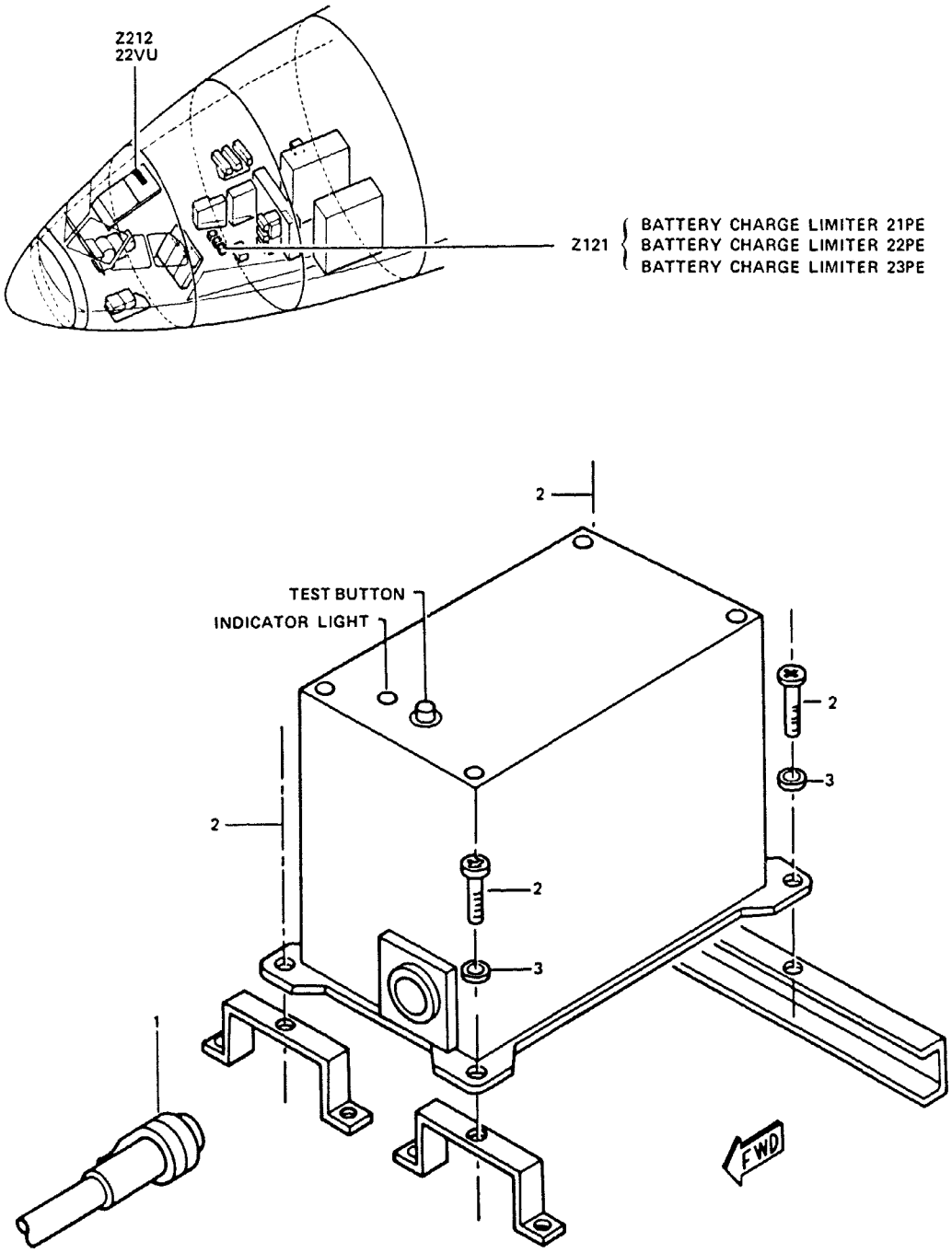
PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 2	31PE	206/D25

(c)For battery 3 charge controller 23PE.

PANEL	SERVICE	IDENT.	LOCATION
22VU	ELEC/BAT/PICK UP/& OVHD/ANN	1PE	206/D22
22VU	ELEC/BAT/CNTOR/POS/ANN	6PE	206/D23
22VU	ELEC/BAT/CHARGE UNIT/& V IND/BAT 3	32PE	206/D26

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connector (1) from battery charge controller.
(2)Loosen the four attaching screws (2), retain screws (2) and washers (3).
(3)Remove battery charge controller from its support.

C. Installation



Battery Charge Controller
Figure 401

(1)Position battery charge controller on its supports.
(2)Install screws (2) and washers (3), then tighten.
(3)Connect electrical connector (1) to battery charge controller.
(4)Remove safety clips and tags and close circuit breakers 1PE, 6PE, 30PE, 31PE and 32PE.

D. Close-Up
(1)Make certain that BAT pushbutton switches are released.
(2)Close access door 121BL.
(3)Remove warning notices.

E. Test
(1)Perform an operational Battery charge controller bite test (Ref. 24-31-00, P. Block 501)

SHUNT-BATTERY - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Warning Notice
C.	Blanking Plugs/Caps
Referenced Procedures	
- 24-31-00, P. Block 501	Batteries - DC Generation
- 24-41-00, P. Block 301	AC External Power Control

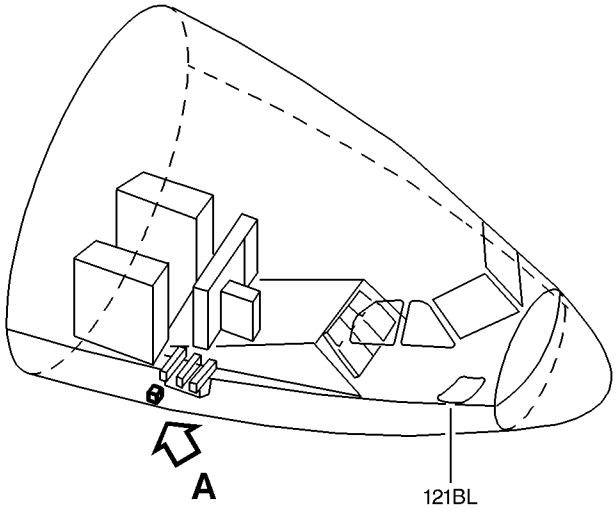
2. Procedure

A. Job Set-Up
  (1)Open access door 121BL.
  (2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
  (3)Make certain that electronics racks ventilation is correct.
  (4)In flight compartment, on overhead panel 424VU release BAT pushbutton switches and install a warning notice prohibiting actuation of Bat 1, 2, 3.
  (5)Open, safety and tag the following circuits breakers.

PANEL	SERVICE	IDENT.	LOCATION
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	24PE	A1
281VU	BAT1/401PP/BAT BUS/CNTOR/SUPPLY	27PE	A2
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	25PE	A3
281VU	BAT2/402PP/BAT BUS/CNTOR/SUPPLY	28PE	A4
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	26PE	A5
281VU	BAT3/403PP/BAT BUS/CNTOR/SUPPLY	29PE	A6

B. Removal (Ref. Fig. 401)
  (1)Remove the bolts (8), remove and discard the lockwashers (9), remove the washers (10) and the ground cables (11).
  (2)Remove the bolts (4), remove and discard the lockwashers (3), remove the electrical wires (2).
  (3)Remove the bolts (7), the washers (6) and the nuts (1).
  (4)Remove the battery shunt (5).

C. Installation
  (1)Clean the component interface and/or the adjacent area.
  (2)Install the battery shunt (5).
  (3)Install the bolts (7), the washers (6) and the nuts (1).
  (4)TORQUE the nuts (1) to between 40 and 44.51 lbf.in. (0.45 and 0.50 m.daN).
  (5)Install the ground cables (11), the washers (10), new lockwashers (9) and the bolts (8).
  (6)TORQUE the bolts (8) to between 53.10 and 79.65 lbf.in. (0.60 and 0.90 m.daN).



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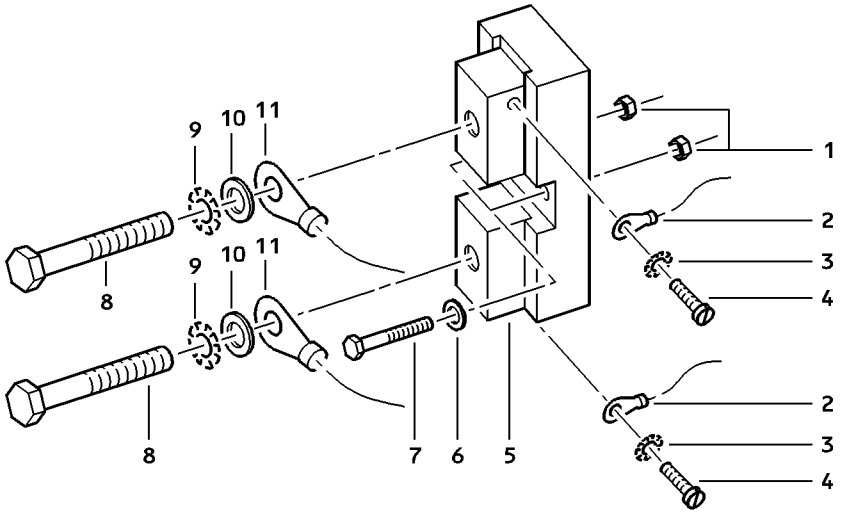

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Shunt-Battery Removal/Installation
Figure 401

(7)Install the electrical wire (2), a new lockwasher (3) and the bolt (4).
(8)TORQUE the bolts (4) to between 22.12 and 33.63 lbf.in. (0.24 and 0.38 m.daN).
(9)Remove safety clips and tags and close circuit breakers 24PE, 25PE, 26PE 27PE, 28PE and 29PE.

F. Close-Up
(1)Make certain that BAT pushbutton switches are released.
(2)Close access door 121BL.
(3)Remove warning notices.
(4)De-energize aircraft electrical network (Ref. 24-41-00, P. Block 301).

DC NORMAL GENERATION

1. General

The normal DC generation is provided by the two transformer rectifiers 1 and 2 which deliver power in parallel on the normal 28VDC distribution network (DC NORM BUS 1PP).

They are normally supplied with three-phase 115V/400Hz from the normal AC distribution network.

Each transformer rectifier is associated with a current sensor which function is to protect the network and which is located in the DC power center.

2. Component Location

(Ref. Fig. 001, 002, 003)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1PU	TRANSFORMER RECT-1		122	121BL	24-32-11
2PU	TRANSFORMER RECT-2		122	121BL	24-32-11
3PU	CNTOR-TR1	106VU	122	121BL	24-32-17
4PU	CNTOR-TR2	106VU	122	121BL	24-32-17
5PU	SENSOR-NO DC/REV DC, TR1	106VU	122	121BL	24-32-15
6PU	SENSOR-NO DC/REV DC, TR2	106VU	122	121BL	24-32-15
7PU	SHUNT-TR1		122	121BL	24-32-41
8PU	SHUNT-TR2		122	121BL	24-32-41
9PU	P/BSW-TR1 RESET	472VU	212		24-32-00
10PU	P/BSW-TR2 RESET	472VU	212		24-32-00
13PU	MFA-TR1	472VU	212		24-32-00
14PU	MFA-TR2	472VU	212		24-32-00
16PN	WARNING LIGHT-DC NORM BUS OFF	424VU	211		24-32-00
6XX	CNTOR-TR2 GND/NORMAL SUPPLY	101VU	121	121BL	24-42-13
14XX	SWITCH-MAINT BUS ON	800VU	120		24-42-00

3. Control and Indicating Circuits

R

(Ref. Fig. 004)

(Ref. Fig. 005)

The transformer rectifiers start to operate as soon as they are supplied

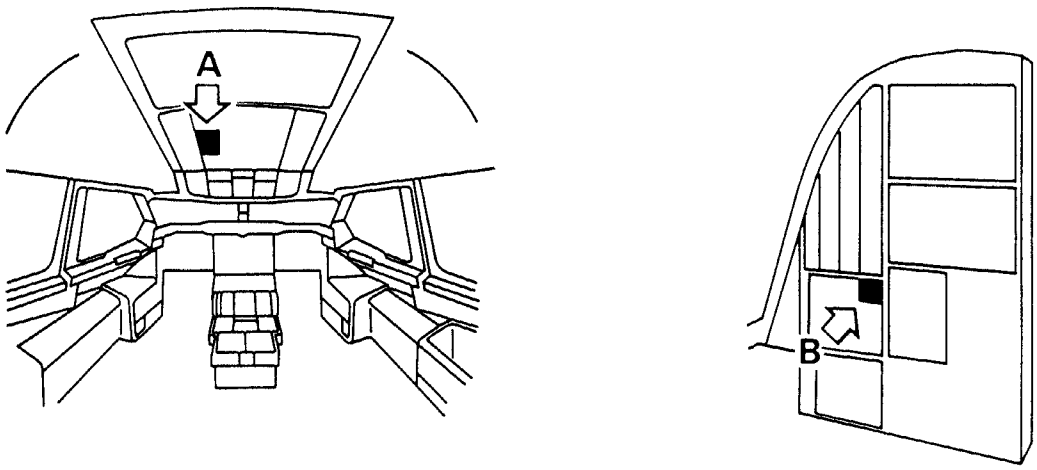
- TR1 is supplied by 1XP
- TR2 is normally supplied by 2XP.

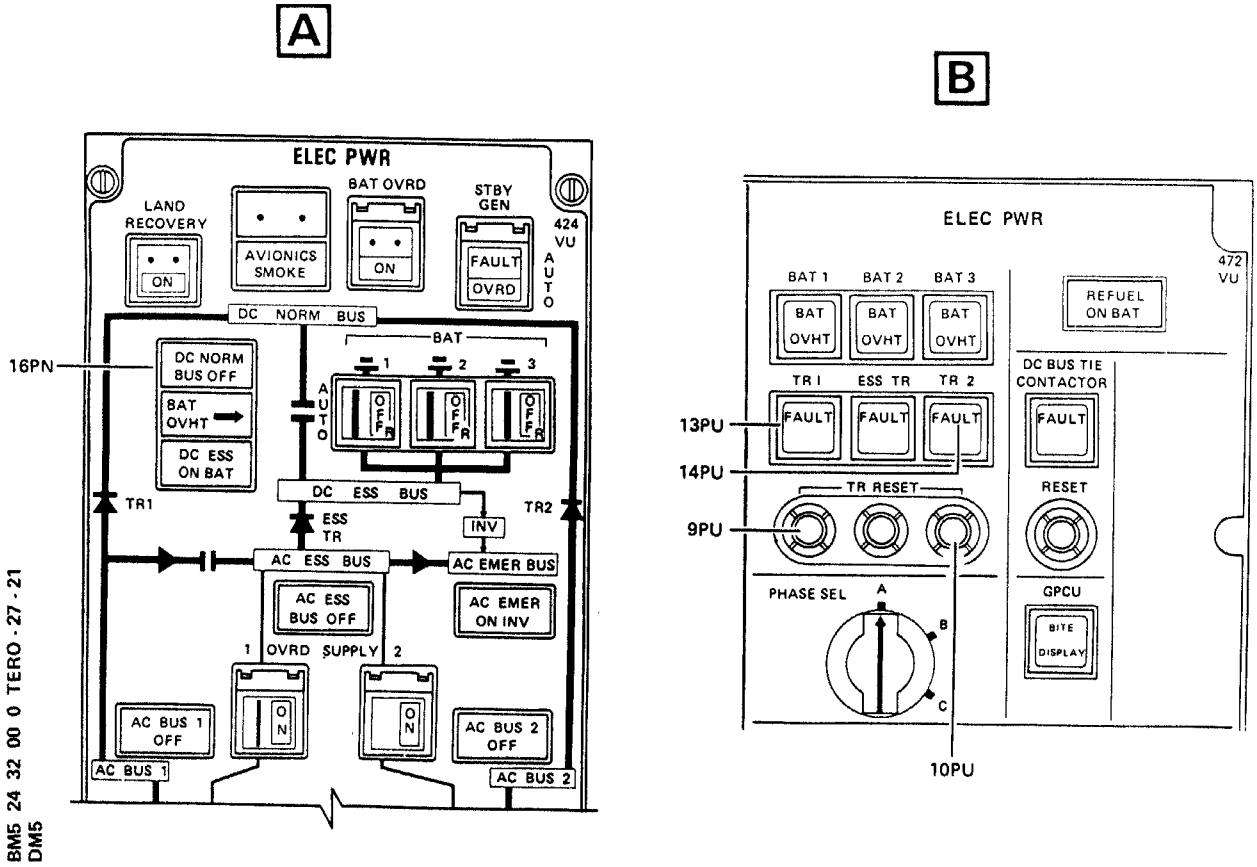
NOTE : TR2 also enables supply of part of the DC network directly from the ground power unit and in ground service configuration (Ref. 24-42-00, P. Block 1)

Each TR delivers power via its split contactor which is controlled by a current sensor.

The current sensor which is located in the normal compartment of the DC power center (Ref. 24-50), has several functions :

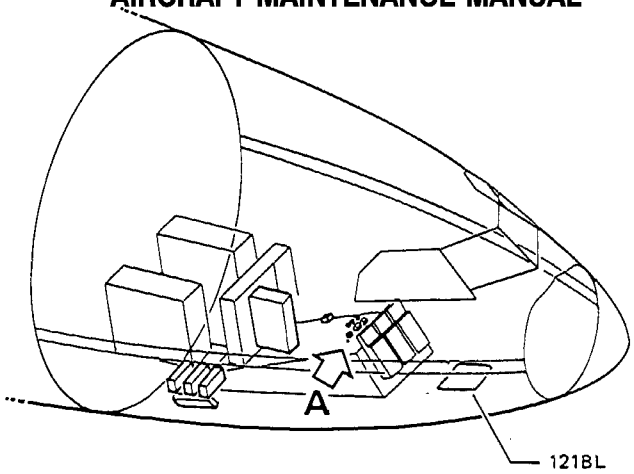
- to protect the network by detecting high reverse current in the direction distribution busbar to TR (fault on the TR feeder or inside the TR), and opening of the split contactor.
- to protect the TR in the event of an overheat, by opening of its split



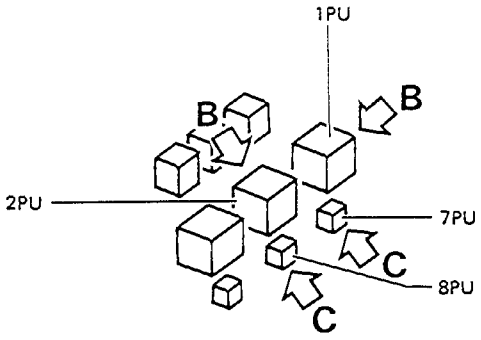


BM5 24 32 00 0 TERO - 27 - 21
DM5

DC Normal Generation - Control and Indicating - Location
Figure 001



A



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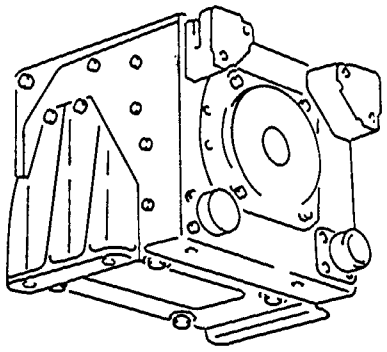
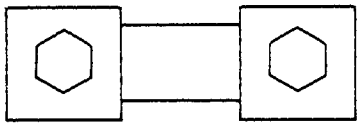


TRANSFORMERS RECTIFIERS - 1PU - 2PU

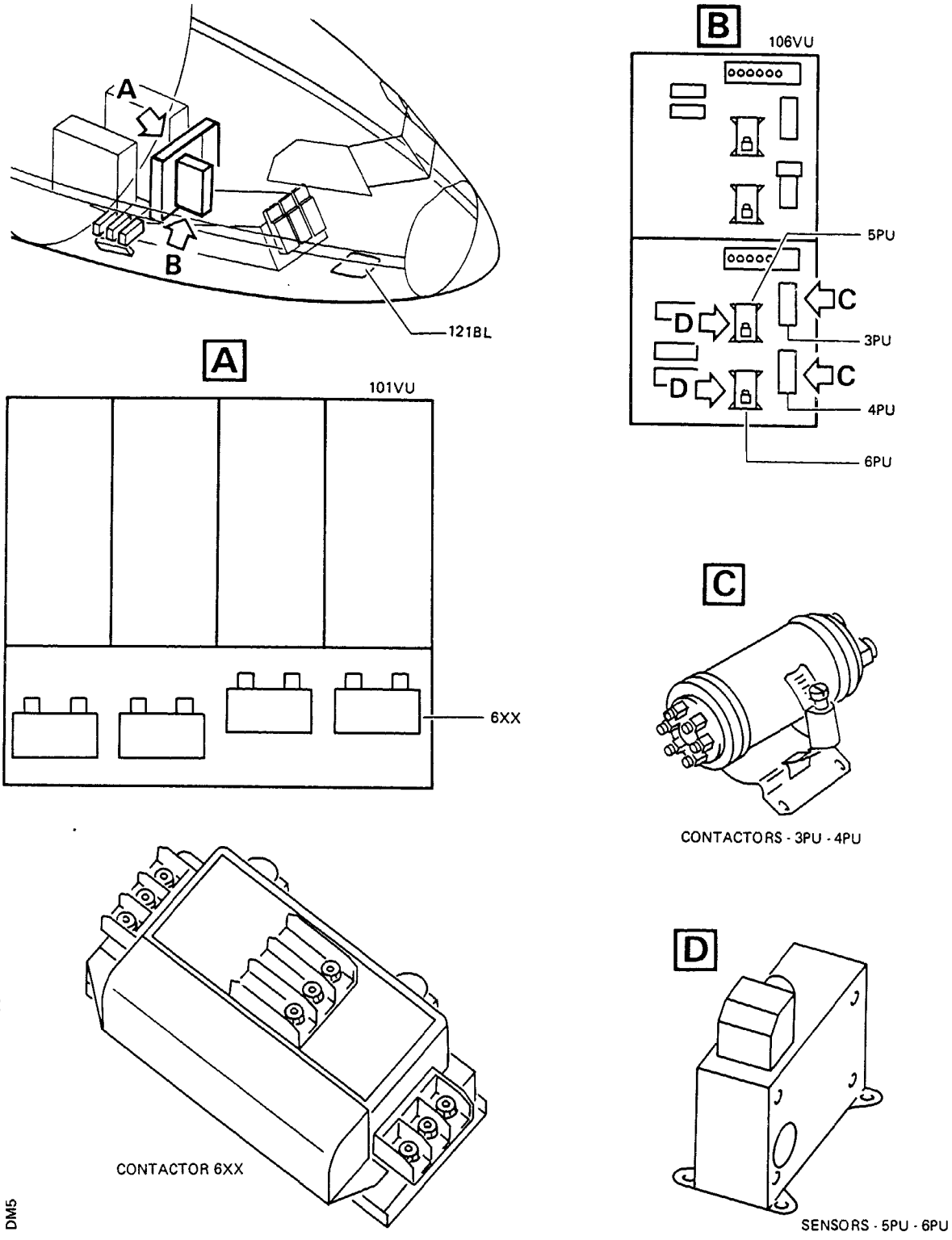
C



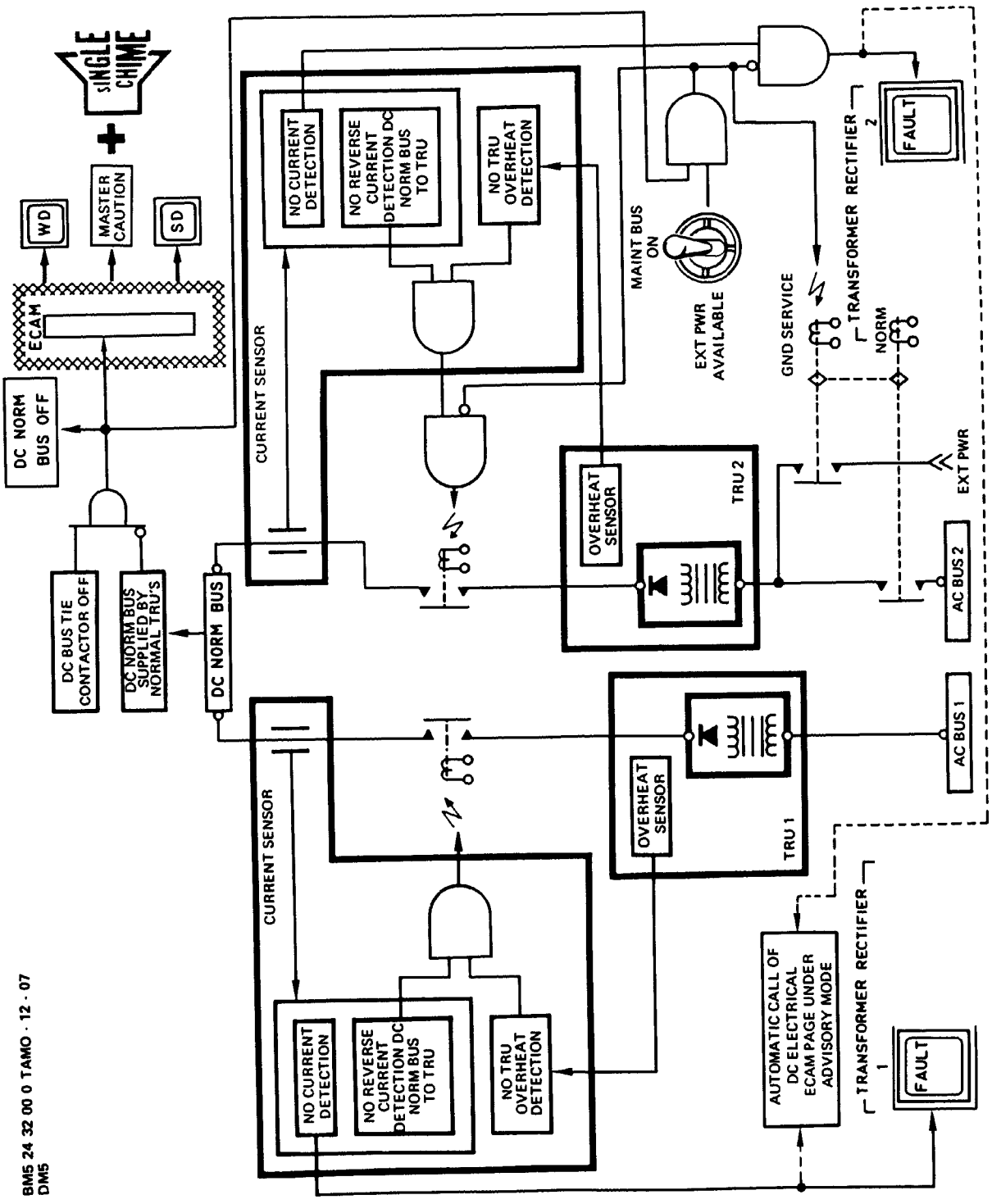
SHUNTS - 7PU - 8PU

BM5 24 32 00 0 BEMO - 08 - 03
DM5

DC Normal Generation - Avionics Compartment - Location
Figure 002



DC Normal Generation - Avionics Compartment - Location
Figure 003



DC Normal Generation - Control and Indicating Diagram
Figure 004

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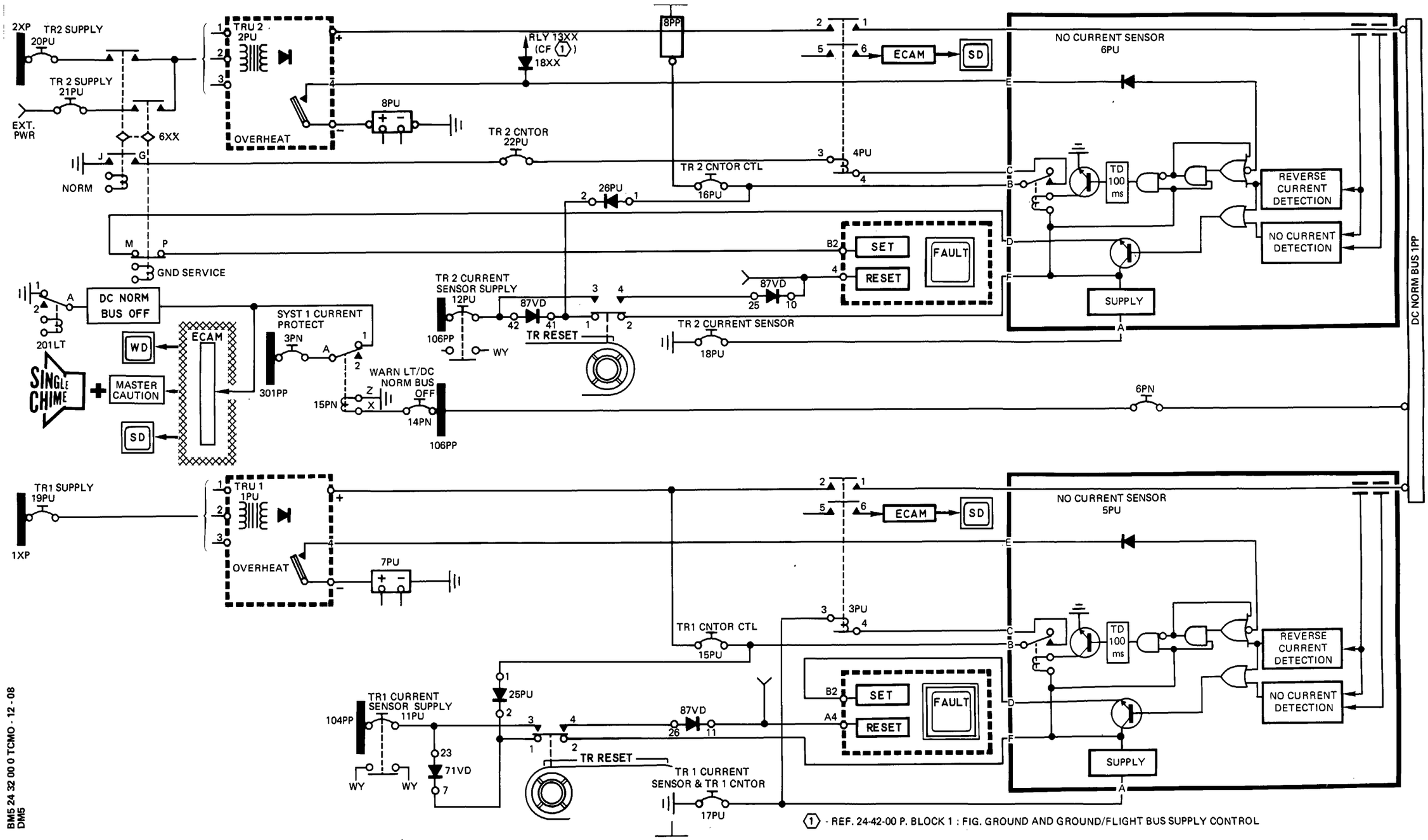


BM5 24 32 00 0 TCMO - 12 - 08
DM5

DC Normal Generation - Control and Indicating - Schematic
Figure 005

contactor
- to indicate failure on the maintenance panel by no-current detection.

For each TR, the maintenance panel comprises the following items :
- an ELEC PWR/TR memorized fault annunciator indicating a no-current detection
- an ELEC PWR/TR RESET pushbutton switch enabling system and indication resetting should one of the protection devices trip.

NOTE : Moreover, for each TR, any no-current detection causes the automatic call of the ELEC DC page on the R ECAM display unit in advisory mode (the faulty TR current indication flashes in green, if reverse current is > 6 ± 2A, Ref. 24-00-00, P. Block 1).

4. Transformer Rectifier (Ref. Fig. 006)

The transformer rectifier is mainly composed of :
- a transformer and a rectifier assembly
- a fan controlled by an electronic module.

A. Operation

The transformer comprises
- a primary star connected winding, the middle tap of which allows step voltage selection (MAX, MID, MIN).

**ON A/C ALL

The design setting corresponds to the MOYEN (MID) position and must not be changed
- two secondary windings, one is star connected and the other delta connected.

The secondary three phase voltage outputs are full wave rectified by diode bridge.
The negative bridge leads are connected to the negative TR terminal, and the positive bridge leads are interconnected by an interphase coil (secondary current balance, ripple attenuation), and to the positive TR terminal.
A filter is connected between the two output terminals.

B. Cooling

In the majority of operating cases, the TR is cooled by natural convection. It is nevertheless equipped with an electric fan to provide forced ventilation in some specific operating cases.
This fan is started automatically
- either from primary current information and for a level which approximately corresponds to half nominal load
- or by a signal delivered by a thermoswitch installed on the radiator of one of the diode bridges.

The fan stops, after a time delay when the control signal disappears.
A overheat signal is sent by a second thermoswitch mounted on the radiator of the other diode bridge. This thermoswitch is set to a higher temperature

than the first.

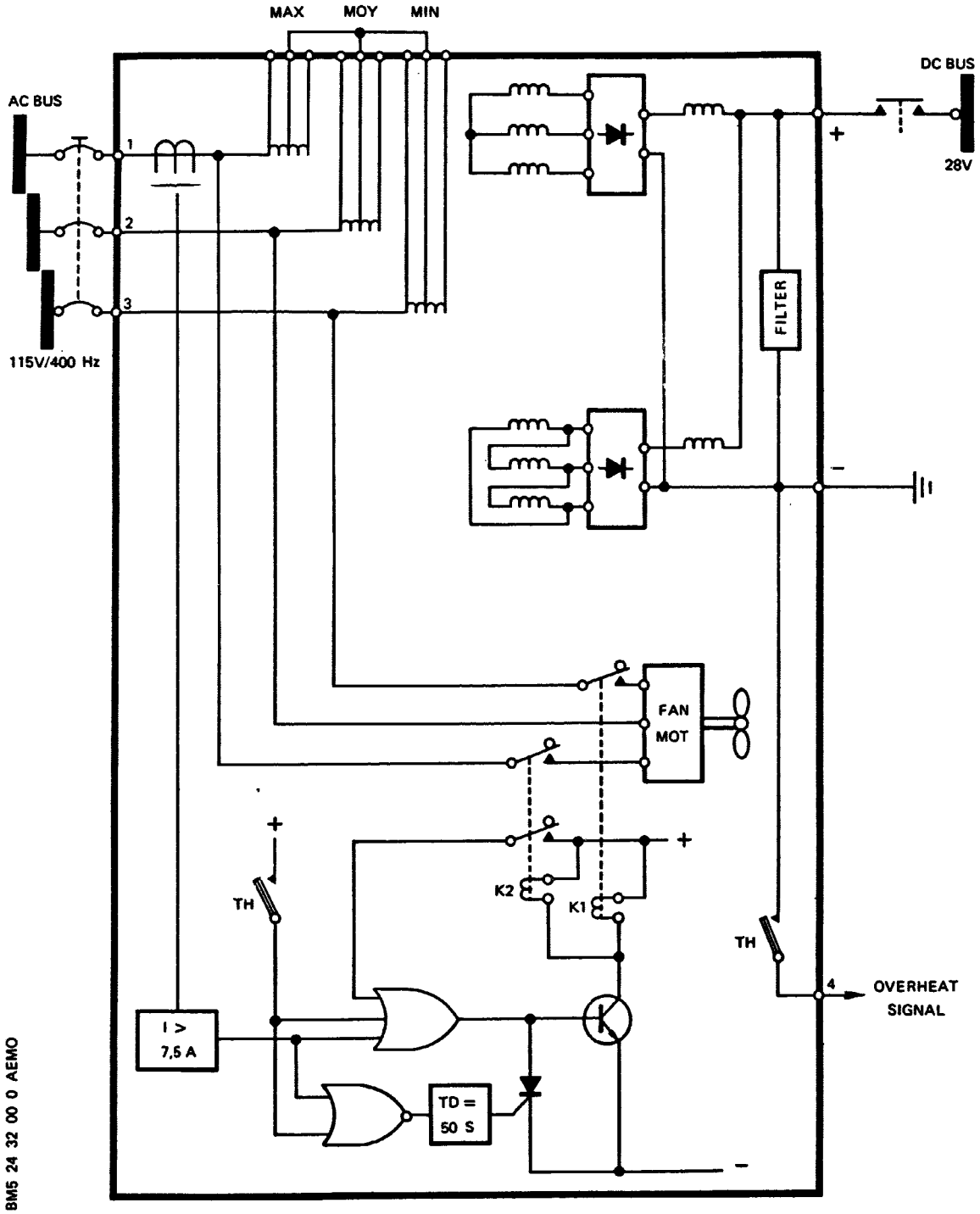
C. General Characteristics
- Part number : BRONZAVIA F11 QY3121
- Supply : 115V/400Hz three phase
  Efficiency : > 0.8 -|
  Power factor : > 0.9 -| at nominal load
  Consumption - no load < 1.5 A
  - at nominal load : 14.1 A ± 0.5 A

**ON A/C ALL

- Output voltage
  no load : 30.7V ± 0.25V -|
  at nominal load : 27.2V ± 0.25V -| for MOY setting

**ON A/C ALL

- Nominal load : In = 150 A
- Overload capability : 1.5 In (225 A) : 5 mn
  2.5 In (375 A) : 30 sec.
  1000 A : 1 sec
- Residual voltage : 2.3V max. peak to peak
  4.8KHz (twelve phase rectification)
- Internal load resistance filter : 150 Ω ± 10%
- Fan : RPM : 20,000 approx.
  starting : Is ≥ 82 A DC ± 3 A
  or T° > 110°C ± 5°C
  stopping : Is < 79 A DC ± 3 A
  or T° < 93.3°C ± 5°C
  stopping time delay : 50 sec. ± 15
- Overheat signal : T° ≥ 176°C ± 5°C



DC Normal Generation - Transformer Rectifier
Figure 006

R **ON A/C ALL

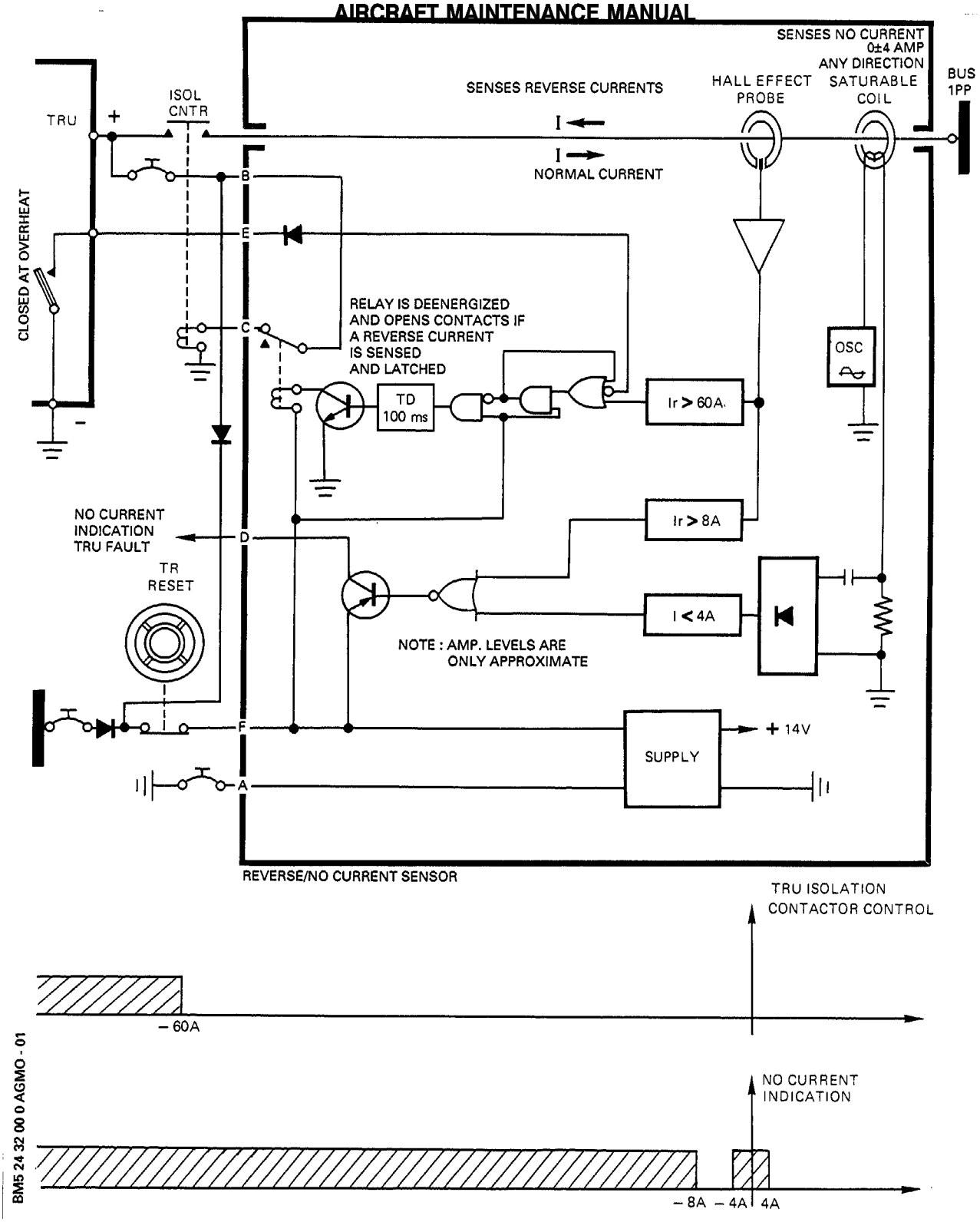
5. Current Sensor (Ref. Fig. 007)
The current sensor measures the direct current running through a cable crossing through the sensor. This sensor has two distinct functions
- TR split contactor control
- no current indication

A. TR Split Contactor Control
The current sensor permanently measures the current running through it by means of a Hall effect probe located in the gap of a magnetic circuit surrounding the power cable.
This probe is sensitive to the direction of the current and is adapted for measuring high intensities.
After amplification, comparison with a reference (60A ± 6A), and logic processing, the signal delivered by the probe controls the contactor by means of an internal relay.
The command logic of this relay can receive an external signal (TR overheat).
Detection of a fault (high reverse current or overheat) is automatically latched and lead to a TR contactor opening.
The system can be reset by momentarily cutting off the supply (RESET).

B. No Current Indication
The no-current detection is performed by a saturable induction coil, the magnetic circuit of which surrounds the power cable.
This coil, which is not sensitive to the direction of the current is adapted for monitoring low currents.
It is supplied by an internal AC source (oscillator) in series with a load.
The voltage at the terminals of this load, which is representative of the saturation condition of the coil, i.e. of the current flowing through the sensor, commands the indication after conditioning and comparison to a reference (I ≤ 4A ± 1A).
The no-current detection, performed by this measurement channel (not sensitive to the direction of the current and adapted for monitoring low current) is completed in the higher reverse current range by information from the Hall effect probe measurement channel (I Rev > 8A ± 2A) (See Diagram) (Ref. Fig. 007)

C. General Characteristics
- Part Number : ECE 293 GC 01Y02
- Supply : U = 18 to 31.5 VDC
- TR split contactor control :
  . reverse current > 60A ± 6A
  . external signal (TR overheat) : ground
  . time delay : 85ms to 110ms for U = 28V
  . automatically latched
- No-current indication control
  . decreasing current ≤ 4A ± 1A (hysteresis of 1A approx.)
  . reverse current > 8A ± 2A

NOTE : Reverse current detection is provided for U ≥ 8V and timing is of 85 ms to 180 ms for 8V ≤ U ≤ 28V (tolerances included).



DC Normal Generation - No Current Sensor
Figure 007

1. Operational Test

A. Reason for the Job

R Check of DC BUS TIE contactor and TR cooling fans

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)On panel 424VU, make certain that BAT pushbutton switches are pressed in.

(d)On panel 800VU
- place MAINT BUS switch in ON position.

(e)On panel 429VU, place APU MASTER switch in OFF position.

(f)Open the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU - START	50KA	317/B54
131VU	APU - ECB SUPPLY - MAIN	1KD	317/B57
131VU	APU - ECB BACK-UP - SUPPLY	58KD	317/B52
131VU	APU - ECB BACK-UP - CTL	71KD	317/B53

(g)Make sure that the following circuit breaker is closed:

PANEL	SERVICE	IDENT.	LOCATION
106VU	ESS TR & DC BUS TIE-CNTOR	19PC	

(2)Test

ACTION	RESULT
(a)On panel 424VU - press and release EXT PWR push-button switch	On panel 424VU - AVAIL legend comes on and ON legend goes off - AC BUS 1 OFF, AC BUS 2 OFF and AC ESS BUS OFF advisory lights come on - AC EMER ON INV indicator light comes on. - DC NORM BUS OFF and DC ESS ON BAT

ACTION	RESULT
	advisory lights come on.
- after 3 minutes, press EXT PWR pushbutton switch	- AVAIL legend goes off and ON legend comes on - all other indications go off. In the avionics compartment - make certain that fan of ESS TR is operating (by placing the hand over). - the fan will stop after 50 s approx.
(b)On panel 472VU - press on TR1 and ESS TR RESET pushbutton switches and keep pressed in	
On panel 429VU - place APU MASTER SW in ON position	- make certain that fan of TR2 is operating (by placing the hand over).
On panel 472VU - release TR1 and ESS TR RESET pushbutton switches	
On panel 429VU - place APU MASTER SW in OFF position	- the fan will stop after 50 s approx.
(c)On panel 472VU - press on TR2 and ESS TR RESET pushbutton switches and keep pressed in	
On panel 429VU - place APU MASTER SW in ON position	- make certain that fan of TR1 is operating (by placing the hand over).
On panel 472VU - release TR2 and ESS TR RESET pushbutton switches	
On panel 429VU - place APU MASTER SW in OFF position	- the fan will stop after 50 s approx.

(3)Close-up
(a)Close circuit breakers 50KA, 1KD, 58KD and 71KD.

(b)On panel 429VU, place APU MASTER switch in OFF position.
(c)On panel 800VU, place MAINT BUS switch in OFF position.
(d)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Functional Test

A. Reason for the Job
(1)Test of one normal TR (TR1 or TR2) fan.
(2)Test of essential TR (ESS TR) fan and reverse current protection unit (5PC) associated with DC BUS TIE CONTACTOR.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Uncap probes (pitot, static, temperature, angle of attack).
(b)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Make certain that electronics racks ventilation is correct.
(d)Make certain that the ECAM circuit breakers are closed. Activate the ECAM and select ELEC DC page.
(e)On panel 450VU, place AVNCS COMPT LT switch in operating position.
(f)On panel 429VU, place APU MASTER switch in ON position.
(g)Open the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU - START	50KA	317/B54
131VU	APU - ECB SUPPLY - MAIN	1KD	317/B57
131VU	APU - ECB BACK-UP - SUPPLY	58KD	317/B52
131VU	APU - ECB BACK-UP - CTL	71KD	317/B53

(2)Test of a normal TR fan (TR1 or TR2)
NOTE : Make certain that transformer rectifier is set to MOY. (The inscription MOY must be in the alignment of the black dot on the plug).
(a)On panel 425VU
- place DC ELEC IND selector switch in the TR position required and check that an amperage value is indicated on the ECAM ELEC DC page.
(b)Open the following circuit breakers to isolate the two other TRs :
1 For TR1 operational :

PANEL	SERVICE	IDENT.	LOCATION
106VU	ESS TR CONTROL	14PC	A26
106VU	TR2 CONTROL	16PU	A14

2 For TR2 operational :

PANEL	SERVICE	IDENT.	LOCATION
106VU	ESS TR CONTROL	14PC	A26
106VU	TR1 CONTROL	15PU	A15

(c)If necessary, activate the following systems so that the current delivered by the TR being tested is higher than 90A :
1 In forward compartment :
- place FWD CARGO COMPT LT 4LU and FWD CARGO LOADING AERA LIGHT 5LU in ON position.

2 On panel 423VU
- place DOME switch 14LE in operating position
- place STORM switch 6LE in ON position.

3 On panel 414VU
- place PED FLOOD 115LE and OVHD FLOOD 114LE rheostats in BRT position.

4 On panel 433VU, PROBE HEAT section :
- press CAPT pushbutton switch
- press STBY pushbutton switch
- press F/O pushbutton switch.

(d)On panel 425VU (or on the ECAM ELEC DC page), check that the ammeter indicates 90A approximately.
NOTE : If 90A cannot be reached, then perform the operational test of TR fan (Ref. 24-32-00, P. Block 501 Para. 1.) in order to increase the current consumption.

(e)In the avionics compartment, make certain that the fan of the TR under
R test is operating.
R NOTE : The fan of the TR under test will operate continuously if the
R current consumption exceeds the start-up threshold which is
R around 87A.
NOTE : Make certain that the fan operates for a few minutes without any interrruption.
If the fan operates for a few minutes then stops, do the steps 2.C.(2)(c) to 2.C.(2)(e).

(f)Set to OFF all the circuits activated for test purpose (the fan of the TR tested will stop 50s approx. after current reduction).

(g)Close circuit breakers 14PC and 16PU for TR1 operational or 14PC and 15PU for TR2 operational.

(3)Test of TR ESS fan and the reverse current protection unit (5PC) associated with DC BUS tie contactor.
NOTE : Make certain that transformer rectifiers are set on MOY (the inscription MOY must be in the alignment of the red dot on the plug).

(a)On panel 429VU, place APU MASTER switch in OFF position.

(b)Make the current delivered by TR1 and TR2 each read between 22 AMPS and 28 AMPS. Some loads may have to be turned off to meet the upper limit. If necessary to increase the load activate the following system (check on panel 425VU or on ECAM ELEC DC page).
1 In forward cargo compartment

- place FWD CARGO COMPT LT 4LU and FWD CARGO LOADING AERA LIGHT 5LU selector switches in ON position.

2 On panel 423VU
- place DOME switch 14LE in operating position
- place STORM switch 6LE in ON position.

3 On panel 414VU
- place PED FLOOD 115LE and OVHD FLOOD 114LE rheostats in BRT position.

4 On panel 433VU, PROBE HEAT section
- press F/O pushbutton switch.

(c)Check (on ECAM or panel 425VU) that the sum of the current delivered by both TR1 and TR2 is comprised between 45A and 55A.

(d)On panel 429VU, place APU MASTER switch in ON position.

(e)Isolate TR1 and TR2 by opening the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
106VU	TR1 CONTROL	15PU	A15
106VU	TR2 CONTROL	16PU	A14

(f)On panel 425VU
- place ELEC IND DC selector switch in TR ESS position so that the current delivered by the essential TR can be checked.
The DC BUS tie contactor must be closed i.e. green line between NORM BUS and ESS BUS must be present on ECAM ELEC DC page. If current was higher than the upper limit on step (b) the DC BUS tie contactor will be open and green line is not visible on ECAM.

NOTE : If the DC tie contactor does not close after APU MASTER SWITCH in ON position, do a reset of the DC BUS TIE CONTACTOR switch on maintenance panel 472VU.

(g)If necessary, activate the following systems so that the current delivered by the TR ESS is higher than 90A.

1 On panel 433VU, PROBE HEAT section
- press CAPT pushbutton switch
- press STBY pushbutton switch.

(h)On panel 425VU or on ECAM ELEC DC page, check that current indicated is approximately of 90A.

(i)In the avionics compartment make certain that TR ESS fan functions.

R
R NOTE : The fan of the TR under test will operate continuously when
R the current consumption exceeds the start-up threshold which is
R around 87A.

NOTE : Make certain that the fan operates for a few minutes without any interrruption.
If the fan operates for a few minutes then stops, do the steps 2.C.(3)(b) to 2.C.(3)(j).

(j)Activate the following system to increase current consumption on busbar 1PP (higher than 60A), and cause DC BUS TIE contactor opening.

1 On panel 426VU, EXT LT section :
- place WING switch 2LX in ON position.

2 On panel 423VU

- place NO SMOKING switch 32WJ in ON position
- place SEAT BELT switch 33WJ in ON position.

3 On panel 436VU, ANN LT section :
- place TEST/BRT/DIM switch 6LP in TEST position.

4 On panel 472VU, ANN LT section
- place TEST/READ/OFF switch 2WB in TEST position.

(k)The systems activated in the preceding paragraph are de-energized by the opening of DC BUS TIE contactor.

(4)Restoration of the aircraft to initial conditions

(a)Set to OFF all circuits activated for test purposes.

(b)On panel 433VU, PROBE HEAT section :
- make certain that CAPT, STBY and F/O pushbutton switches are released.

(c)On panel 424VU
- press and release EXT PWR pushbutton switch (AVAIL legend on).

(d)Close circuit breakers opened during the tests.

(e)On panel 429VU, place APU MASTER switch in OFF position.

(f)Energize the aircraft electrical network (action on EXT PWR pushbutton switch : ON legend on).

(g)On panel 472VU, press DC BUS TIE CONTACTOR/RESET pushbutton switch.

(h)Select again ELEC DC and AC pages on the ECAM and check conformity of the system.

(5)Close-up

(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Allow probes to cool and install protective caps.

Ref. : MMEL Sect 1-24, Item 14 (Transformer/Rectifier Units (TR))

1. Deactivation

A. Reason for the Job

(1)Isolate the faulty TR circuit.

(2)Check TR1, TR2 or ESS TR fan.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control
R - 24-32-11, P. Block 401	Transformer Rectifier 150A

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics rack is correct.

(2)Deactivation

(a)Open, safety and tag the following circuit breakers :

1 For TR1

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN1/TR1 SUPPLY	19PU	GEN1/B11
106VU	TR1 CONTROL	15PU	A15
106VU	CURRENT/TR1	17PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR1	11PU	331/V76

2 For TR2

R PANEL	SERVICE	IDENT.	LOCATION
R 101VU	TR2 SUPPLY AND 205XP BUS BAR	20PU	GEN2/B14
R 101VU	APU GEN AND/EXT PWR/TR2 SUPPLY	21PU	APU GEN/A06
R 106VU	TR2 CONTROL	16PU	A14
R 106VU	SENSOR CONTACTOR/TR2	18PU	LOWER PART
R 106VU	SENSOR CONTACTOR/TR2	22PU	LOWER PART

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/REV/CRT/SENS/TR2	12PU	332/U76

R

(b)Disconnect and cap connector 3 of TR2 and attach the loom to the structure.

If TR2 has been removed, it is necessary to insulate cables 12 and 4 (Ref. 24-32-11, P. Block 401).

(3)Test for isolation of the faulty TR

ACTION	RESULT
On ELEC IND panel 425VU DC section - place DC parameter selector switch in TR1 or TR2 position as required	On ELEC IND panel 425VU DC section : - no indication must appear on either indicator

(4)Test of TR1, TR2 or ESS TR fan

ACTION	RESULT
On lateral panel 472VU : - press simultaneously TR RESET pushbutton switches of the two TRs not involved and maintain pressed	In the avionics compartment : - make certain that the fan of TR remaining in charge operates (place the hand over)
- release the pushbutton switches.	- the fan stops operating.

(5)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control
R - 24-32-11, P. Block 401	Transformer Rectifier 150A

B. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain electronics rack ventilation is correct.
R

(2)Reactivation
(a)Detach the loom from the structure, remove the cap and connect the connector 3 of TR2. If TR2 has been removed, install it (Ref. 24-32-11, P. Block 401).
(b)Remove safety clips and tags and close circuit breakers :
- for TR1 :
11PU, 15PU, 17PU and 19PU
- for TR2
12PU, 16PU, 18PU, 20PU, 21PU, 22PU.
(c)Refer to TSM 24-32-00.

(3)Close-up
De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

TRANSFORMER RECTIFIER 150A - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Insulating Sleeves
R C.	Torque Wrench, up to 2 m.daN (177 lbf.in.)
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set Up
(Ref. Fig. 401)
(1)Open door 121BL.
(2)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that electronics racks ventilation is correct.
(4)Open, safety and tag the following circuit breakers :
(a)For TR1 (1PU)

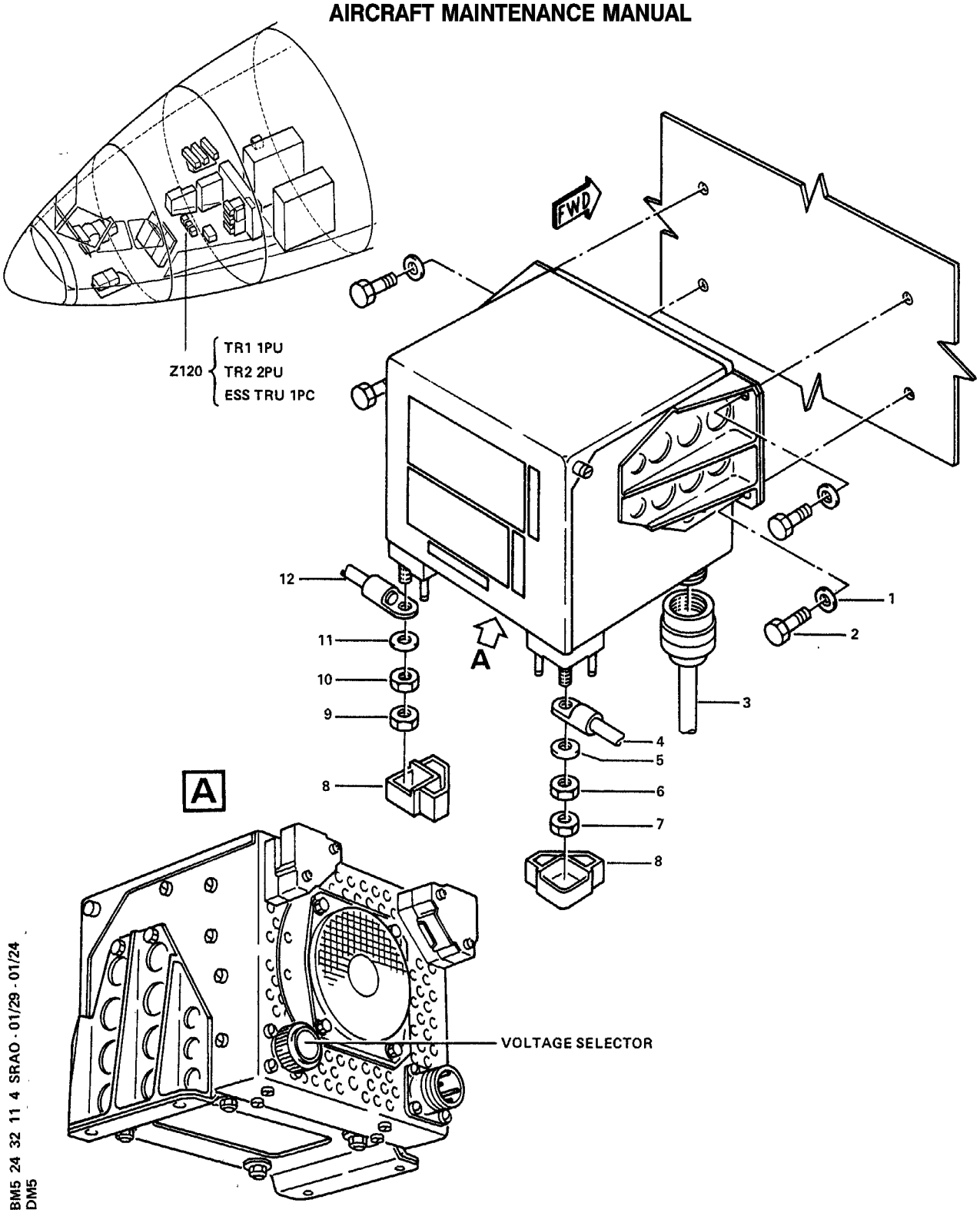
PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 1/TR1/SUPPLY	19PU	B 11
106VU	TR1 CONTROL	15PU	A 15
106VU	CURRENT/TR1	17PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR1	11PU	331/V76

(b)For TR2 (2PU)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 2/TR2/SUPPLY	20PU	B 14
101VU	APU GEN AND/EXT PWR/TR2/SUPPLY	21PU	A 6
106VU	TR2 CONTROL	16PU	A 14
106VU	SENSOR CONTACTOR/TR2	18PU	LOWER PART
106VU	SENSOR CONTACTOR/TR2	22PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR2	12PU	332/U76
133VU	ELEC/TR2 CTL/NORM	9XX	331/V85
133VU	ELEC/TR2 CTL/SVCE	19XX	331/V84

(c)For ESS TR (1PC)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 2/ESS BUS AND ESS TR SPLY	8XH	C14
101VU	GEN 1/ESS BUS AND ESS TR SPLY	9XH	C11
101VU	GEN 1/ESS BUS AND ESS TR SPLY	10XH	C 8
106VU	ESS TR CONTROL	14PC	A26
106VU	ESS TR & DC BUSTIE CRT SENS	18PC	UPPER PART
133VU	STAT INV/CTL	1XE	333/T79



DC Generation - Transformer Rectifier
Figure 401

B. Removal
(1)Remove protective caps (8) from DC output terminals.
(2)For the "+" output terminal
- Remove locknut (9), nut (10), washer (11) and disconnect output cable (12).
(3)For the "-" output terminal
- Remove locknut (7), nut (6), washer (5) and disconnect output cable (4).
(4)Install insulating sleeves on cable lugs.
(5)Disconnect and cap electrical connector (3).
(6)Remove bolts (2) and washers (1).
(7)Remove transformer rectifier from mount.

C. Preparation of Replacement Component
(1)Make certain that voltage selector located on lower panel of transformer rectifier is in MOY position.

D. Installation
(1)Position transformer rectifier on mount.
(2)Position bolts (2), washers (1) and tighten.
(3)For the "+" output terminal
- Connect output cable (12).
R - Install washer (11), nut (10) and TORQUE to 0.9 m.daN
R (79.64 lbf.in.).
R - Install locknut (9) and TORQUE to 0.9 m.daN
R (79.64 lbf.in.).
(4)For the "-" output terminal
- Connect output cable (4).
R - Install washer (5), nut (6) and TORQUE to 0.45 m.daN
R (39.82 lbf.in.).
R - Install locknut (7) and TORQUE to 0.45 m.daN
R (39.82 lbf.in.).
(5)Install protective caps (8) on output terminals of transformer rectifier.
(6)Remove protective cap and connect electrical connector (3).

E. Close-Up
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For TR1 (1PU) : 19PU, 15PU, 17PU and 11PU
(b)For TR2 (2PU) : 20PU, 21PU, 16PU, 18PU, 22PU, 12PU, 9XX and 19XX
(c)For ESS TR (1PC) : 14PC, 18PC, 1XE, 8XH, 9XH and 10XH
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Close access door 121BL.

F. Test
(1)Perform an operational test of TR1, TR2, ESS TR FAN (Ref. 24-32-00, P. Block 501).

ESSENTIAL TR NO DC/REV DC SENSOR 4PC - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips

2. Procedure

(Ref. Fig. 401, 402)

A. Job Set-Up

(1)Open access door 121BL.
(2)Remove door of DC power center 106VU.
(3)Open, safety and tag the following circuit breakers.

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/DC TIE CNTOR CTL	16PC	332/U78
106VU	ESS TR CONTROL	14PC	A26
281VU	BAT1/401PP BAT BUS	27PE	A 2
281VU	BAT2/402PP BAT BUS	28PE	A 4
281VU	BAT3/403PP BAT BUS	29PE	A 6
101VU	GEN2/ESS BUS AND ESS TR SUPPLY	8XH	C14
101VU	GEN1/ESS BUS AND ESS TR SUPPLY	9XH	C11
101VU	GEN1/ESS BUS AND ESS TR SUPPLY	10XH	C08
22VU	ELEC ESS TR REV CURRENT SENSOR	20PC	206/D16

B. Removal

(1)Disconnect connector (11).
(2)Remove nuts (6) and (9) securing bar (7) to contactor (4) and to bar (10). Retain washers (5) and (8).
(3)Remove the four attachment screws (1) with washers (2).
(4)Remove sensor (3) and retain bar (7).

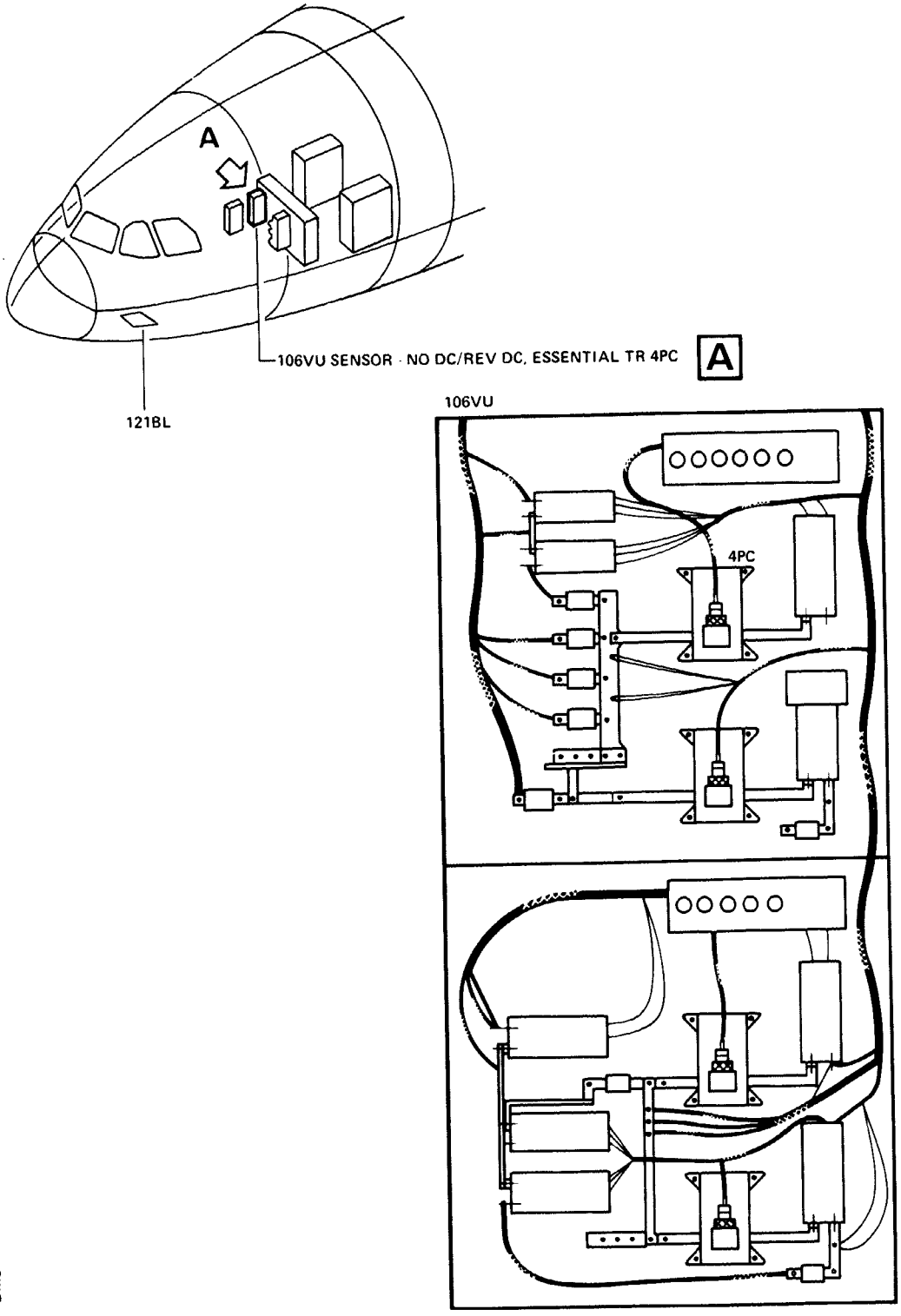
C. Installation

(1)Secure bar (7) to contactor (4) with nut (6) and washer (5). Do not tighten nut at this stage to allow movement of bar (7).
(2)Engage bar (7) in sensor (3).
(3)Position sensor (3) and secure with the four screws (1) and washers (2).
(4)Tighten nut (6).
(5)Secure bar (7) to bar (10) with nut (9) and washer (8).
(6)Connect connector (11).

D. Close-Up

(1)Install door of DC power center 106VU.
(2)Remove safety clips and tags and close the following circuit breakers : 14PC, 16PC, 20PC, 27PE, 28PE, 29PE, 8XH, 9XH and 10XH.
(3)Close access door 121BL.

R E. Test



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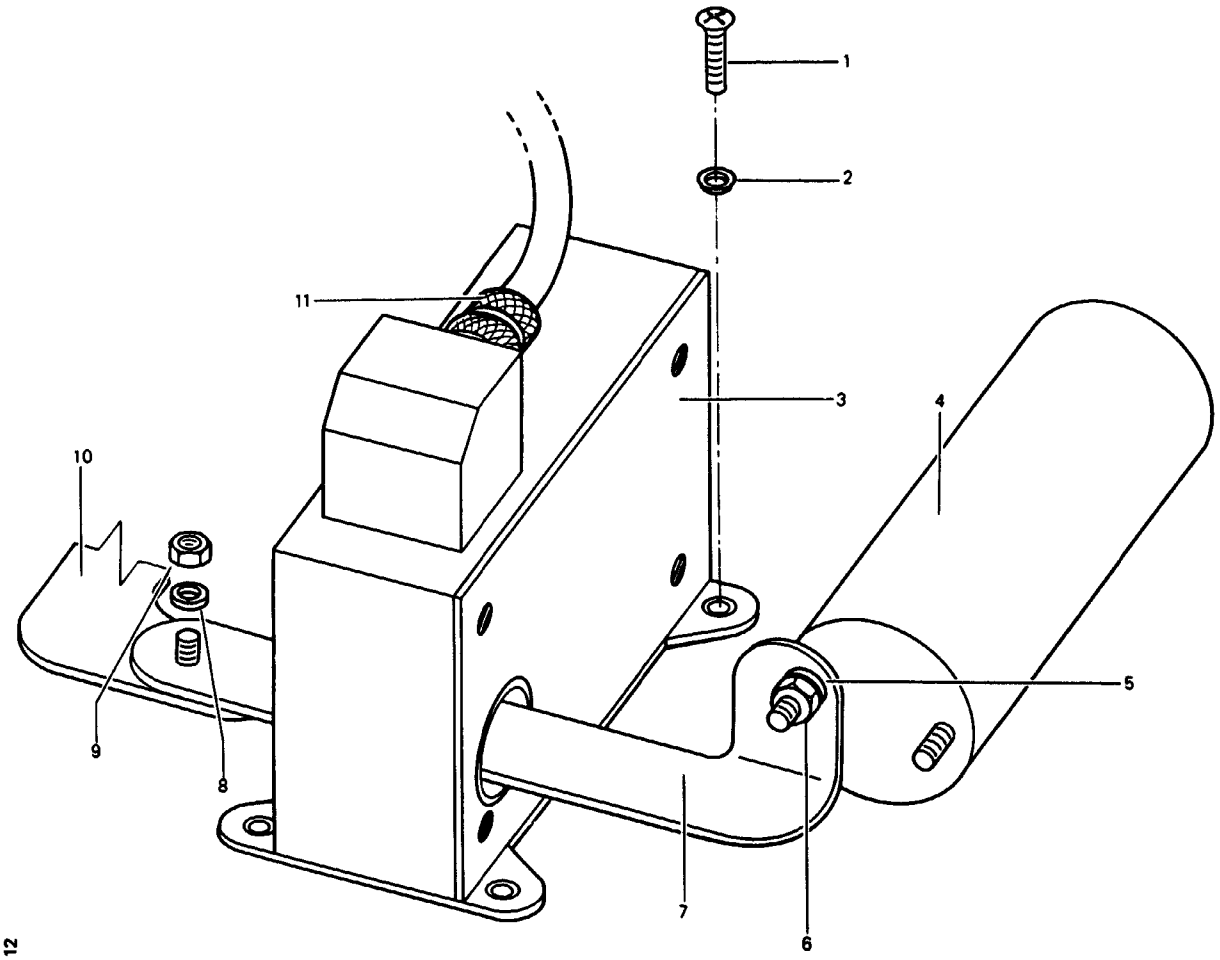
No DC/REV DC Sensor - Location
Figure 401



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No DC/REV DC Sensor
Figure 402

R (1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (2)Make certain that electronics racks ventilation is correct.
R (3)Make certain that the ECAM circuit breakers are closed. Activate the
R ECAM and select ELEC DC page.
R (4)Make certain that no warning appears on the ECAM.
R (5)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).

REV DC/BUS TIE SENSOR 5PC REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips

2. Procedure
(Ref. Fig. 401, 402)

A. Job Set-Up
(1)Open access door 121BL.
(2)Remove door of DC power center 106VU.
(3)Open, safety and tag the following circuit breakers.

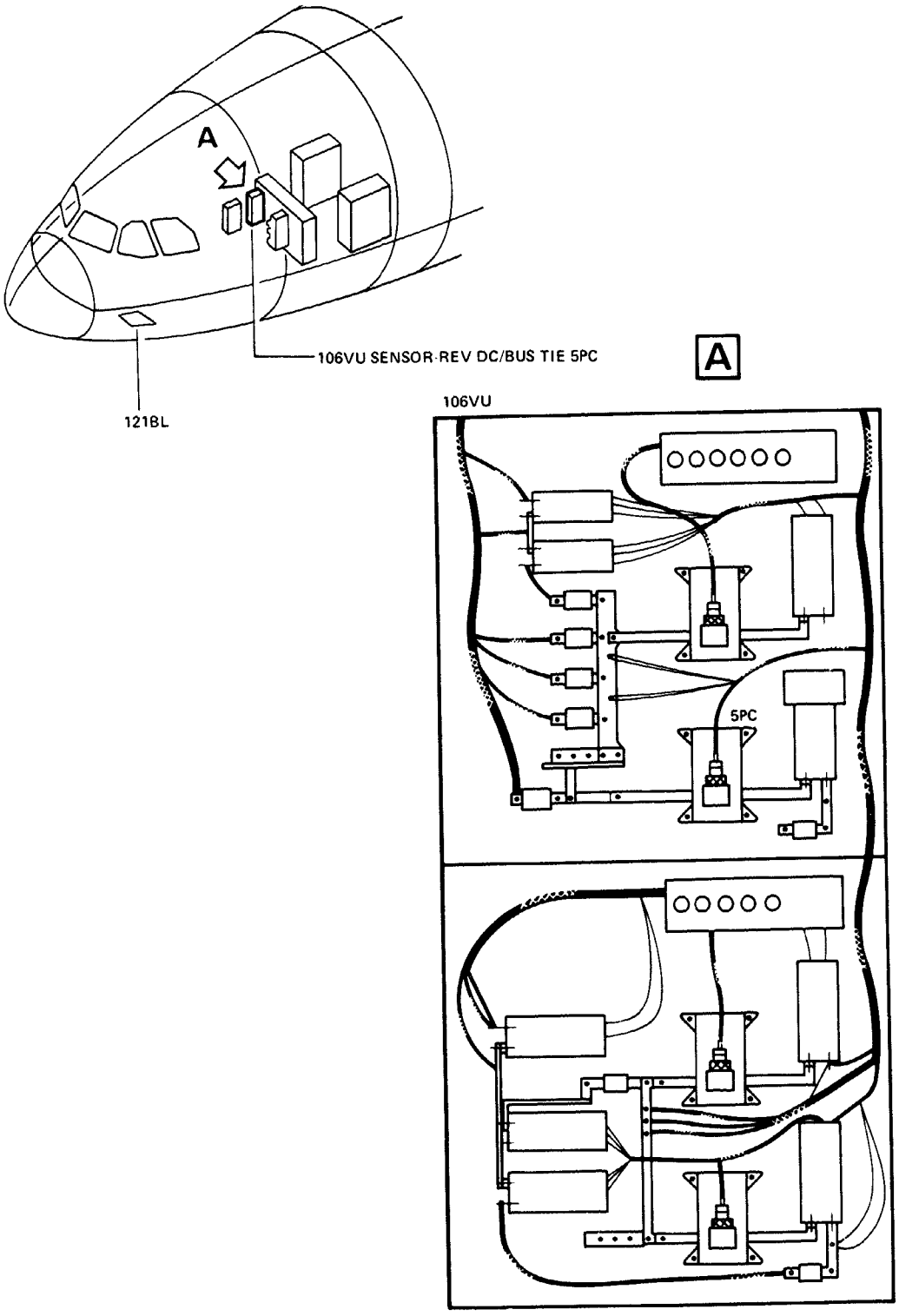
PANEL	SERVICE	IDENT.	LOCATION
106VU	ESS TR CONTROL	14PC	A26
106VU	TR1 CONTROL	15PU	A15
106VU	TR2 CONTROL	16PU	A14
281VU	BAT1/401PP BAT BUS	27PE	A 2
281VU	BAT2/402PP BAT BUS	28PE	A 4
281VU	BAT3/403PP BAT BUS	29PE	A 6
133VU	ELEC/DC TIE CRT SENSOR	8PC	333/T77
133VU	ELEC/DC TIE CNTOR CTL	16PC	332/U78

B. Removal
(1)Disconnect connector (11).
(2)Remove nuts (6) and (9) securing bar (7) to contactor (4) and to bar (10). Retain washers (5) and (8).
(3)Remove the four attachment screws (1) with washers (2).
(4)Remove sensor (3) and retain bar (7).

C. Installation
(1)Secure bar (7) to contactor (4) with nut (6) and washer (5). Do not tighten nut at this stage to allow movement of bar (7).
(2)Engage bar (7) in sensor (3).
(3)Position sensor (3) and secure with the four screws (1) and washers (2).
(4)Tighten nut (6).
(5)Secure bar (7) to bar (10) with nut (9) and washer (8).
(6)Connect connector (11).

D. Close-Up
(1)Install door of DC power center 106VU.
(2)Remove safety clips and tags and close circuit breakers 8PC, 14PC, 16PC, 15PU, 16PU, 27PE, 28PE and 29PE.
(3)Close access door 121BL.

R E. Test



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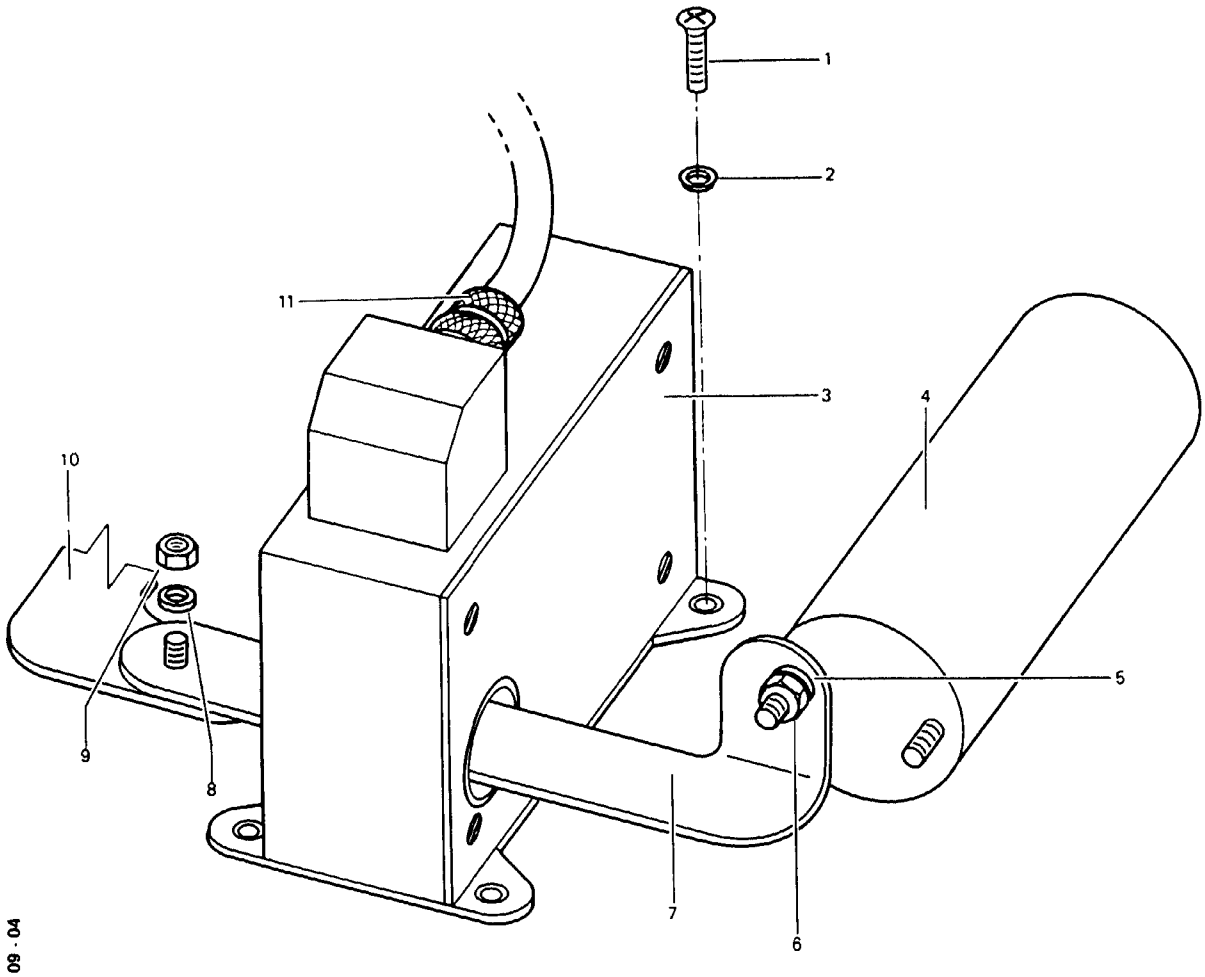
REV DC/BUS TIE Sensor - Location
Figure 401



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REV DC/BUS TIE Sensor
Figure 402

R (1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (2)Make certain that electronics racks ventilation is correct.
R (3)Make certain that the ECAM circuit breakers are closed. Activate the
R ECAM and select ELEC DC page.
R (4)Make certain that no warning appears on the ECAM.
R (5)De-energize the aircraft electrical network (Ref. 24-41-00,
R P. Block 301).

TR1 NO DC/REV DC SENSOR 5PU (6PU) REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
R Referenced Procedure	
R - 24-41-00, P. Block 301	AC External Power Control

2. Procedure
(Ref. Fig. 401, 402)

A. Job Set-Up
(1)Open access door 121BL.
(2)Remove door of DC power center 106VU.
(3)Open, safety and tag the following circuit breakers.
(a)For No DC/Reverse DC sensor 5PU :

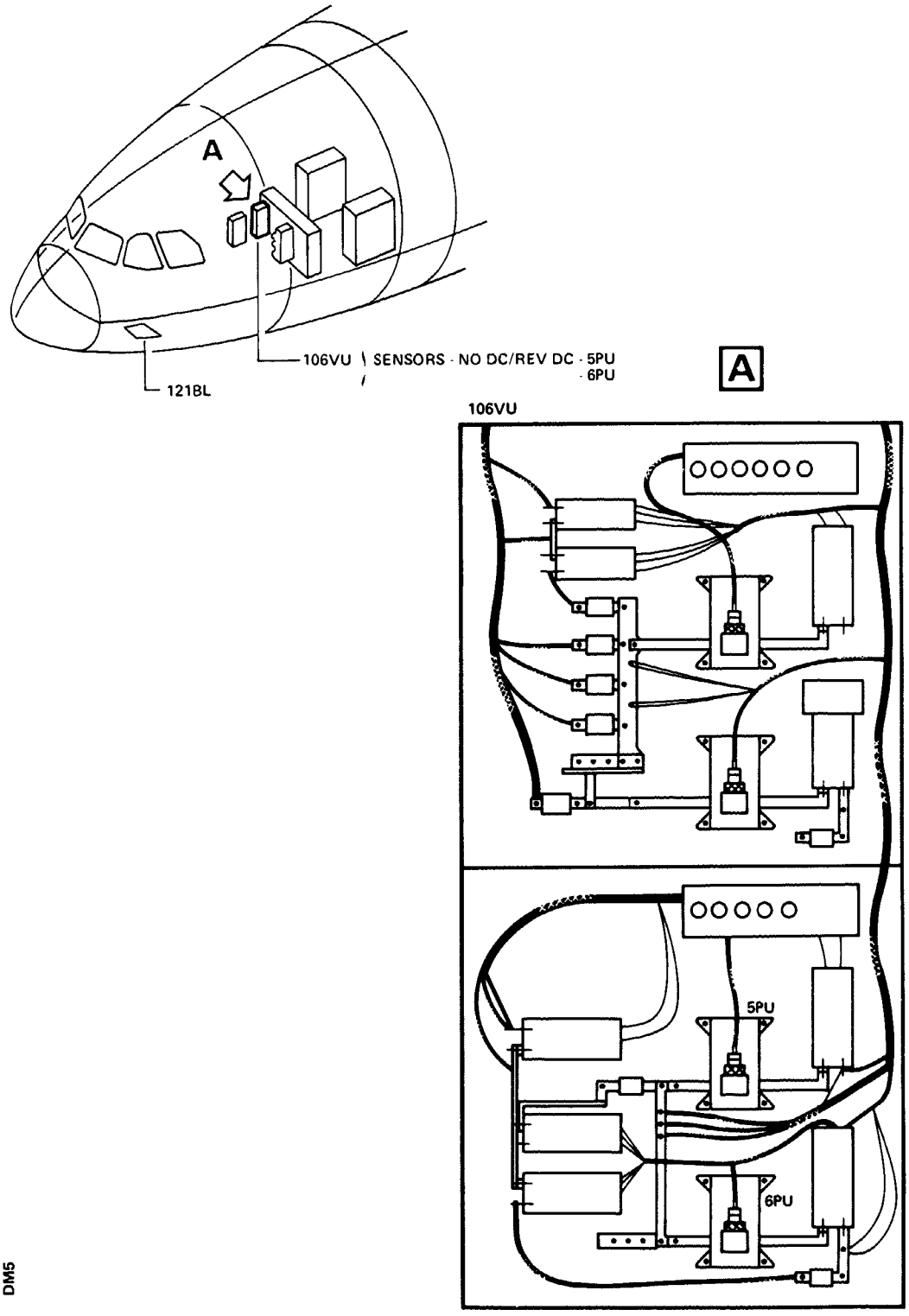
PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/REV CTR/SENS TR1	11PU	331/V76
133VU	ELEC/DC TIE/CNTOR CTL	16PC	332/U78
106VU	TR1 CONTROL	15PU	A15
106VU	TR2 CONTROL	16PU	A14
101VU	TR1 SUPPLY	19PU	B11

(b)For No DC/Reverse DC sensor 6PU

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC/DC TIE/CNTOR CTL	16PC	332/U78
133VU	ELEC/REV CRT/SENS T42	12PU	332/U76
106VU	TR1 CONTROL	15PU	A15
106VU	TR2 CONTROL	16PU	A14
101VU	TR2 SUPPLY	20PU	B14
101VU	TR2 SUPPLY	21PU	A06

B. Removal
NOTE : Removal procedure is identical for No DC/Reverse DC sensors 5PU and 6PU.
(1)Disconnect connector (11).
(2)Remove nuts (6) and (9) securing bar (7) to contactor (4) and to bar (10). Retain washers (5) and (8).
(3)Remove the four attachment screws (1) with washers (2).
(4)Remove No DC/Reverse DC sensor (3) and retain bar (7).

C. Installation
NOTE : Installation procedure is identical for No DC/Reverse DC sensors 5PU and 6PU.
(1)Secure bar (7) to contactor (4) with nut (6) and washer (5). Do not



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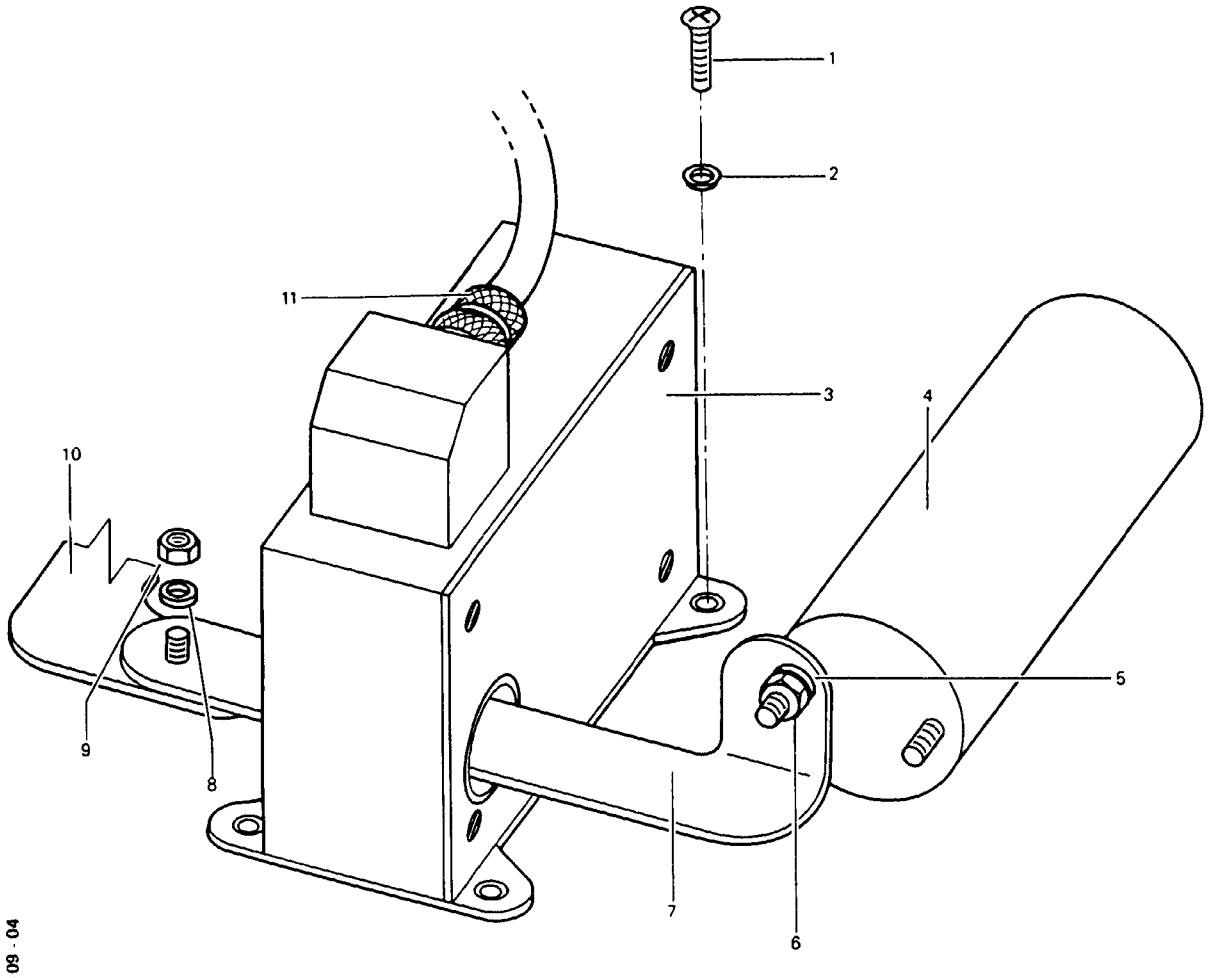
NO DC/REV DC Sensor - Location
Figure 401



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NO DC/REV DC Sensor
Figure 402

tighten nut at this stage to allow movement of bar (7).
(2)Engage bar (7) in No DC/Reverse DC sensor (3).
(3)Position sensor (3) and secure with the four screws (1) and washers (2).
(4)Tighten nut (6).
(5)Secure bar (7) to bar (10) with nut (9) and washer (8).
(6)Connect connector (11).

D. Close-up
(1)Install door of DC power center 106VU.
(2)Remove safety clips and tags and close the following circuit breakers :
(a)For No DC/Reverse DC sensor 5PU : 16PC, 11PU, 15PU, 16PU and 19PU.
(b)For No DC/Reverse DC sensor 6PU : 16PC, 12PU, 15PU, 16PU, 20PU and 21PU.
(3)Close access door 121BL.

R E. Test
R (1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
R (2)Make certain that electronics racks ventilation is correct.
R (3)Make certain that the ECAM circuit breakers are closed. Activate the ECAM and select ELEC DC page.
R (4)Make certain that no warning appears on the ECAM.
R (5)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

TR1 (2) CONTACTOR 3PU (4PU) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 1.6 m (5 ft. 3 in.)
B.	Circuit Breaker Safety Clips
C.	Insulating Sleeves
Referenced Procedure	
- 24-32-00, P. Block 501	DC Normal Generation
- 24-41-00, P. Block 301	AC External Power Control

2. Procedure

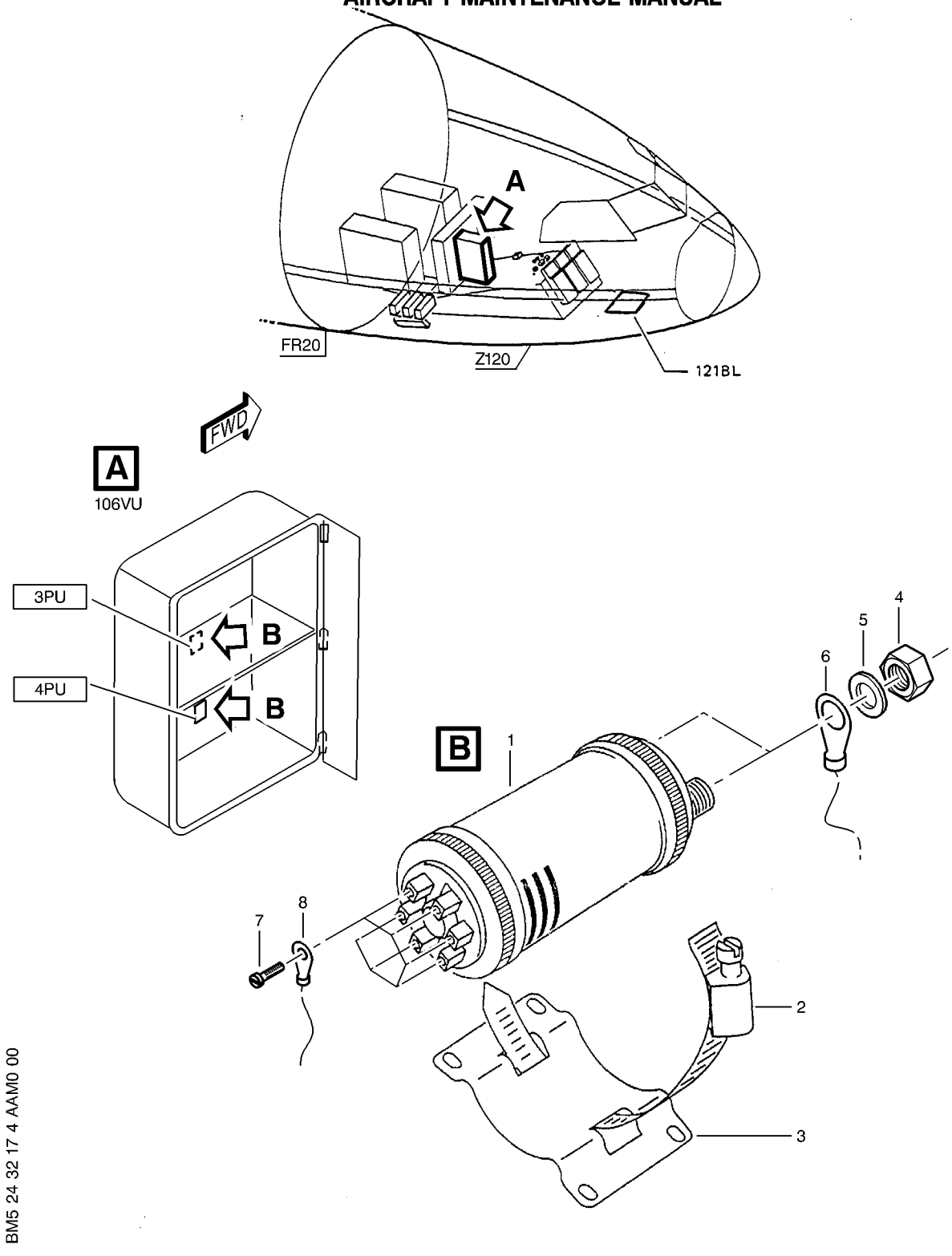
A. Job Set Up
(Ref. Fig. 401)
(1)Put an access platform in position at access door 121BL.
(2)Open access door 121BL.
(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Remove door of DC power center 106VU.
(6)Open, safety and tag the following circuit breakers :
(a)For TR1 (3PU)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 1/TR1/SUPPLY	19PU	B 11
106VU	TR1 CONTROL	15PU	A 15
106VU	CURRENT/TR1	17PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR1	11PU	331/V76

(b)For TR2 (4PU)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 2/TR2/SUPPLY	20PU	B 14
101VU	APU GEN AND/EXT PWR/TR2/SUPPLY	21PU	A 6
106VU	TR2 CONTROL	16PU	A 14
106VU	SENSOR CONTACTOR/TR2	18PU	LOWER PART
106VU	SENSOR CONTACTOR/TR2	22PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR2	12PU	332/U76
133VU	ELEC/TR2 CTL/NORM	9XX	331/V85
133VU	ELEC/TR2 CTL/SVCE	19XX	331/V84

B. Removal
(1)Remove the two nuts (4) and the two washers (5).
(2)Disconnect the two electrical wires (6).
(3)Install insulating sleeves on the cable lugs.
(4)Remove the six screws (7) from the contactor (1).
(5)Disconnect the six electrical wires (8).



TR1 (2) Contactors
Figure 401

(6)Install insulating sleeves on the cable lugs.
(7)Remove clamp (2) from contactor (1) and base (3).
(8)Remove contactor (1).

C. Installation
(1)Clean component interface and/or adjacent area.
(2)Put contactor (1) in position on the base (3).
(3)Install clamp (2) on base (3) and tighten it with contactor (1).
(4)Remove insulating sleeves from cable lugs.
(5)Connect the two electrical wires (6).
(6)Install the two washers (5), the two nuts (4) and tighten.
(7)Connect the six electrical wires (8).
(8)Install the six screws (7) and tighten.

D. Close-Up
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For TR1 (3PU) : 19PU, 15PU, 17PU and 11PU
(b)For TR2 (4PU) : 20PU, 21PU, 16PU, 18PU, 22PU, 12PU, 9XX and 19XX.
(2)Install door of DC power center 106VU.
(3)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(5)Close access door 121BL.
(6)Remove access platform.

E. Test
(1)Perform an operational test of TR1, TR2, ESS TR FAN (Ref. 24-32-00, P. Block 501).

TR1 (2) SHUNT 250A/50MV 7PU (8PU) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 1.6 m (5 ft. 3 in.)
B.	Circuit Breaker Safety Clips
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

2. Procedure

A. Job Set Up
(Ref. Fig. 401)
(1)Put an access platform in position at access door 121BL.
(2)Open access door 121BL.
(3)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(4)Make certain that electronics racks ventilation is correct.
(5)Open, safety and tag the following circuit breakers :
(a)For TR1 (7PU)

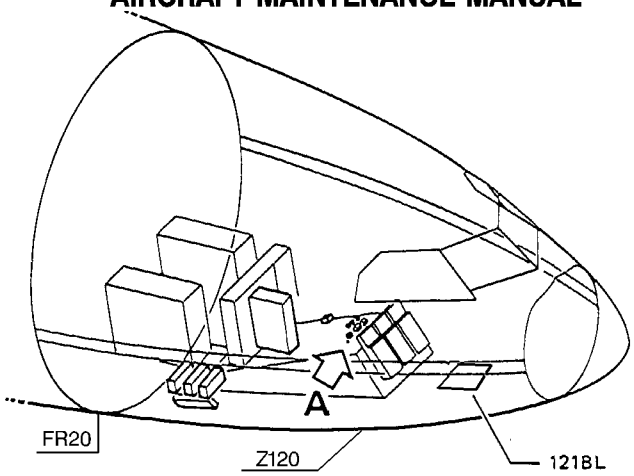
PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 1/TR1/SUPPLY	19PU	B 11
106VU	TR1 CONTROL	15PU	A 15
106VU	CURRENT/TR1	17PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR1	11PU	331/V76

(b)For TR2 (8PU)

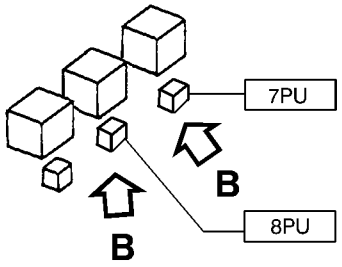
PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN 2/TR2/SUPPLY	20PU	B 14
101VU	APU GEN AND/EXT PWR/TR2/SUPPLY	21PU	A 6
106VU	TR2 CONTROL	16PU	A 14
106VU	SENSOR CONTACTOR/TR2	18PU	LOWER PART
106VU	SENSOR CONTACTOR/TR2	22PU	LOWER PART
133VU	ELEC/REV/CRT/SENS/TR2	12PU	332/U76
133VU	ELEC/TR2 CTL/NORM	9XX	331/V85
133VU	ELEC/TR2 CTL/SVCE	19XX	331/V84

B. Removal
(1)Remove screws (1) and washers (2).
(2)Remove shunt (3) from its support.

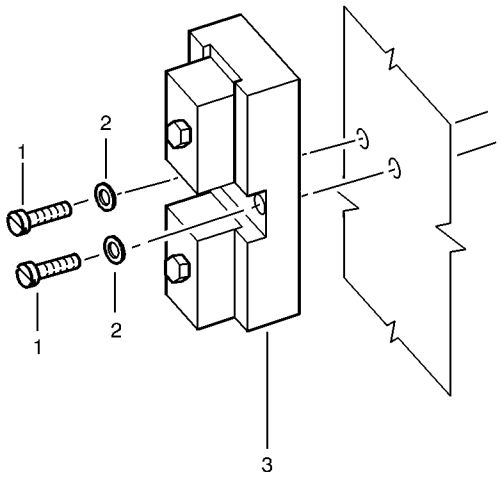
C. Installation
(1)Clean component interface and/or adjacent area.
(2)Position shunt (3) on its support.
(3)Install washers (2), screws (1) and tighten.



A



B



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TR1 (2) Shunts 250A/50MV
Figure 401

D. Close-Up
(1)Remove safety clips and tags and close the following circuit breakers :
(a)For TR1 (7PU) : 19PU, 15PU, 17PU and 11PU
(b)For TR2 (8PU) : 20PU, 21PU, 16PU, 18PU, 22PU, 12PU, 9XX and 19XX.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(3)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(4)Close access door 121BL.
(5)Remove access platform.

DC ESSENTIAL GENERATION

1. General

The DC essential generation is provided by the essential transformer rectifier which supplies the 28VDC essential distribution network (DC ESS BUS 3PP).

It is supplied with 115V/400Hz by the AC essential distribution network.

The TR is associated to a current sensor which protects the network and is located in the DC power center.

The normal network/essential network tie contactor (DC BUS TIE) is included to this generation and enables the whole 28V network to be supplied from only

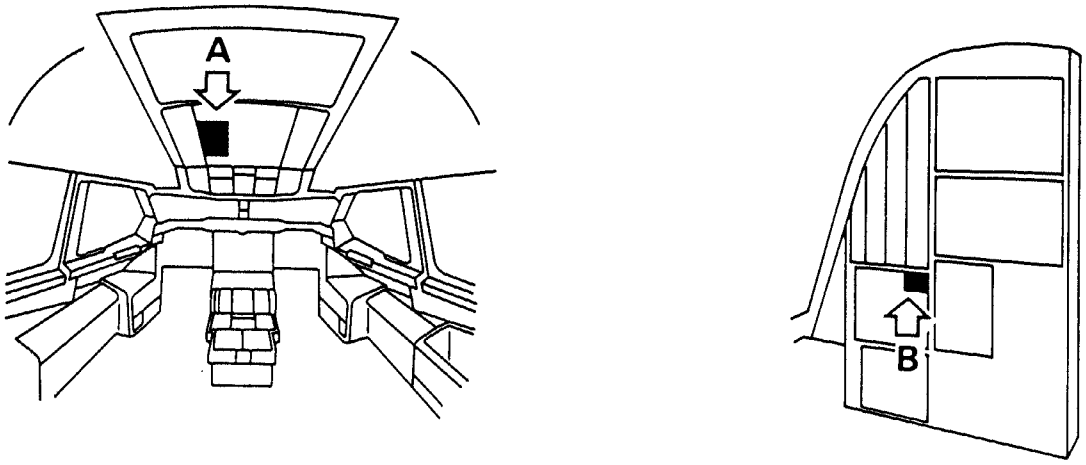
- one normal TR (TR1 or TR2) in case of failure of the two other TRs.
- the essential TR and one normal TR in case of failure of the other normal TR.

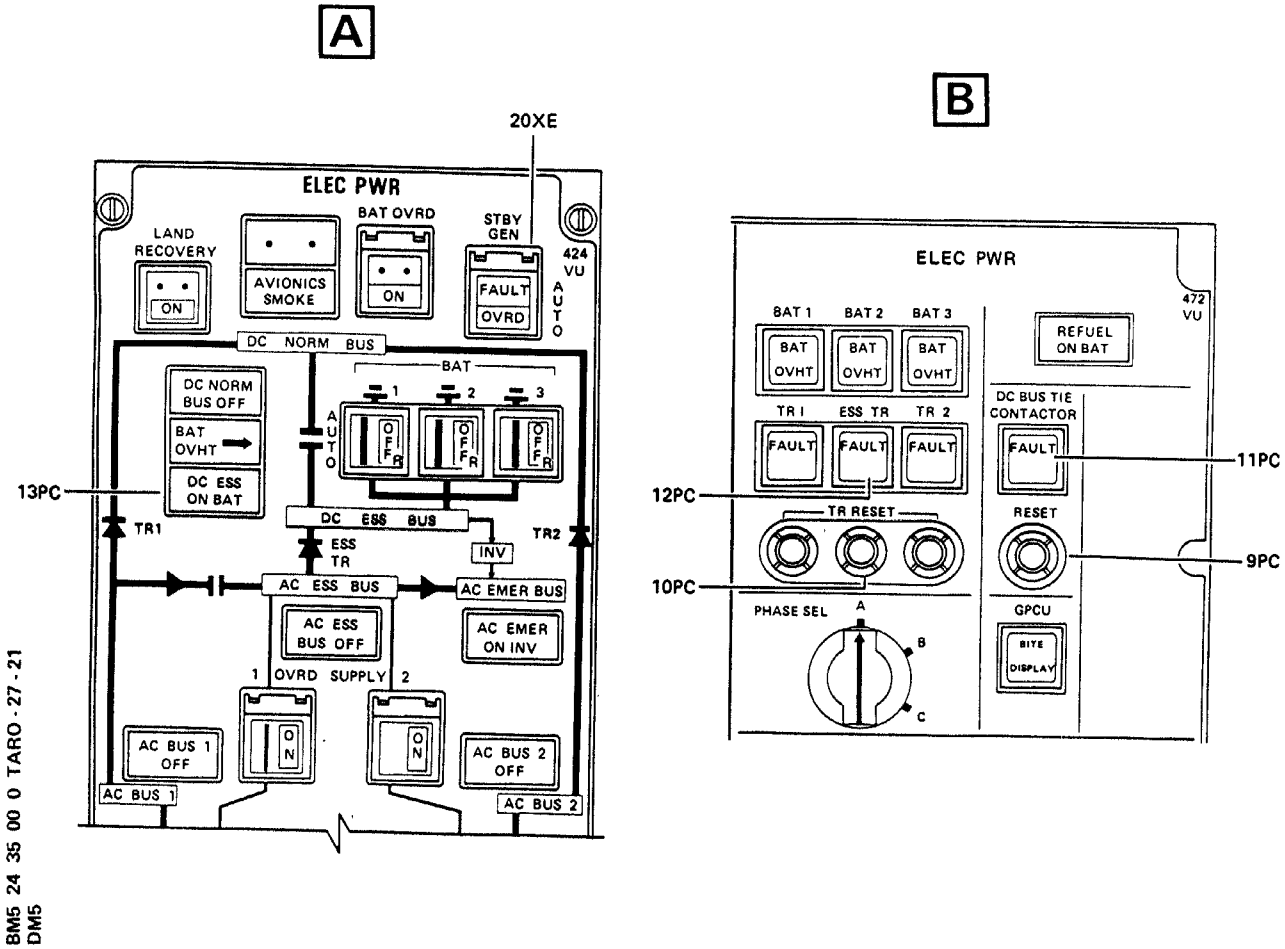
It is also associated to a current sensor which protects the essential network and is located in the DC power center.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
20XE	P/BSW-STBY GEN	424VU	211		24-24-00
1PC	TRANSFORMER RECT-ESS		122	121BL	24-32-11
2PC	CNTOR-ESS TR	106VU	122	121BL	24-35-00
3PC	CNTOR-DC BUS TIE	106VU	122	121BL	24-35-00
4PC	SENSOR-NO DC/REV DC ESS TR	106VU	122	121BL	24-32-12
5PC	SENSOR-REV DC BUS TIE	106VU	122	121BL	24-32-15
6PC	SHUNT-ESS TR		122	121BL	24-35-00
9PC	P/BSW-ELEC PWR/RESET	472VU	212		24-35-00
10PC	P/BSW-ESS TR RESET	472VU	212		24-35-00
11PC	MFA-DC BUS TIE CONTACTOR	472VU	212		24-35-00
12PC	MFA-ESS TR	472VU	212		24-35-00
13PC	WARNING LIGHT-DC ESS ON BAT	424VU	211		24-35-00





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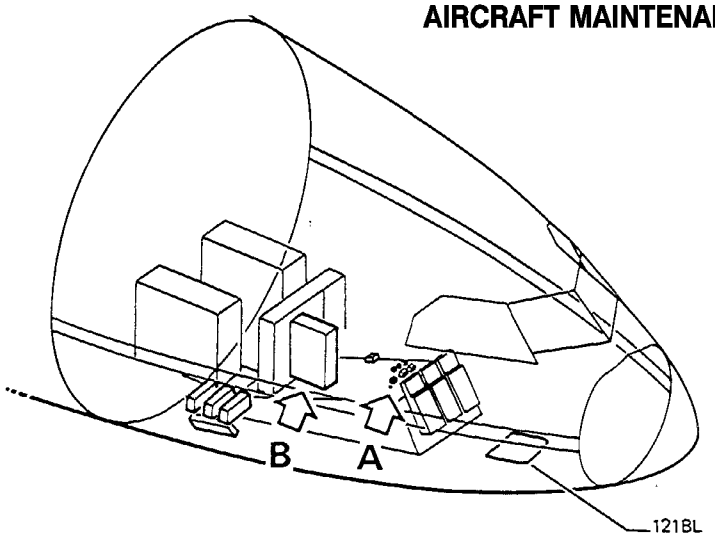
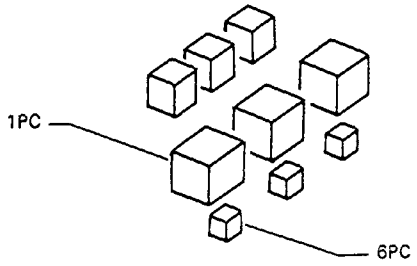
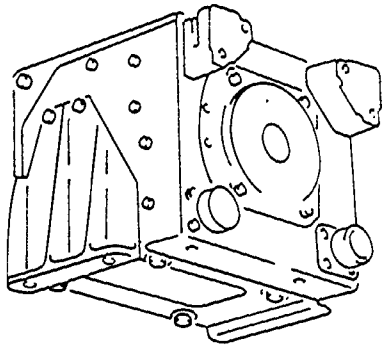
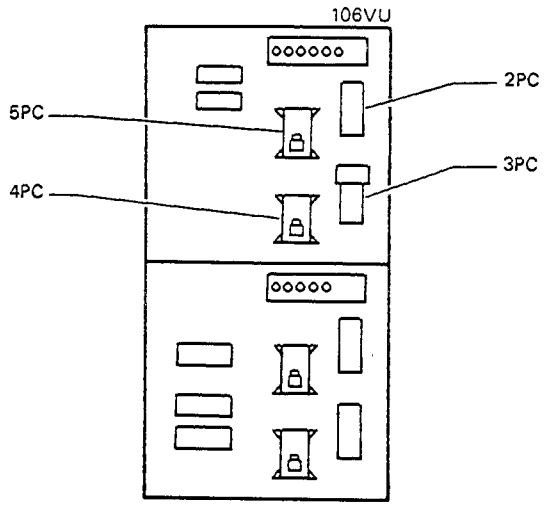
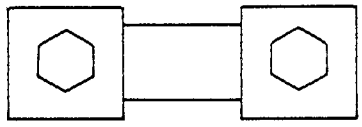
DC Essential Generation - Control and Indicating
Location
Figure 001

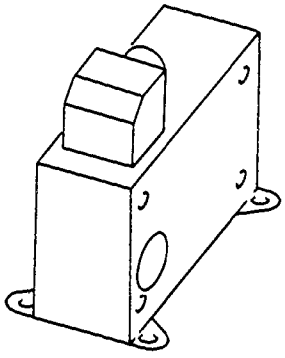


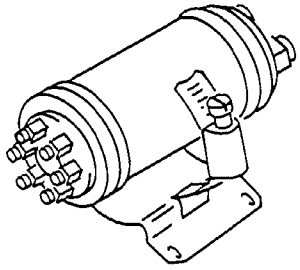



TRANSFORMER RECTIFIER 1PC




SHUNT 6PC


SENSORS - 4PC - 5PC


CONTACTORS - 2PC - 3PC

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DC Essential Generation - Avionics Compartment - Location
Figure 002

3. Control and Indicating Circuits
(Ref. Fig. 003)
(Ref. Fig. 004)
These circuits are similar to those of the normal generation and use the same type of equipment (TR, current sensor) (Ref. 24-32-00, P. Block 1)

A. Essential Transformer Rectifier Circuits
The essential transformer rectifier operates as soon as it is supplied :
- in normal configuration, by 1XP
- in smoke emergency configuration, directly by generator 1 upstream of its line contactor, or, possibly, by generator 2 (Ref. 24-25-00, P. Block 1)

It supplies the network by means of its split contactor which is controlled by a current sensor located in the power center essential compartment (Ref. 24-50-00, P. Block 1) and which provides the same functions as the normal generation sensors viz. :
- protection of the network by detecting high reverse current
- TR protection in case of overheat
- no current indication.

On the maintenance panel
- TR (1, 2, ESS) memorized fault annunciator indicates a no current detection
- TR RESET pushbutton switches enable resetting of the system and indication, in the event of protection tripping.

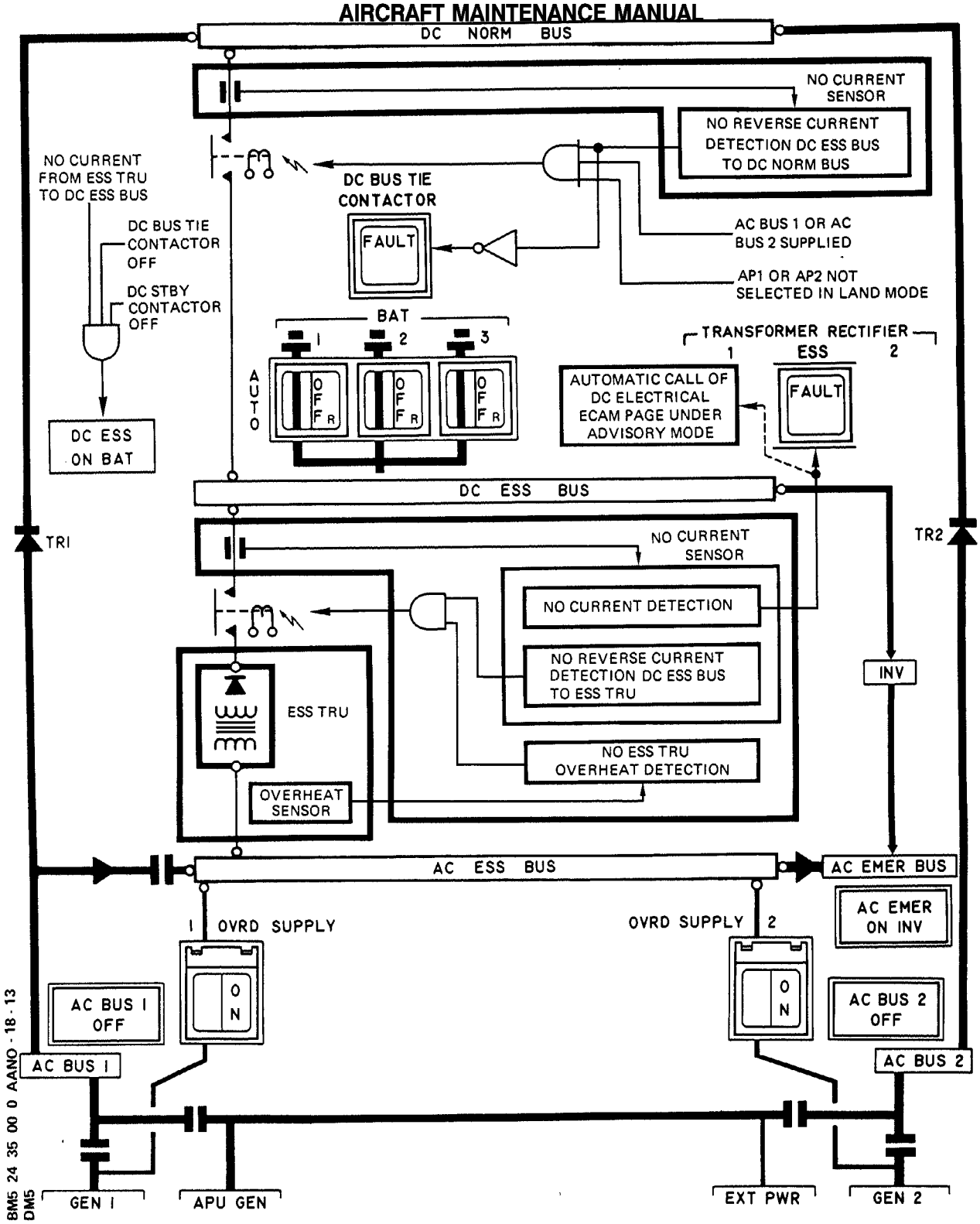
NOTE : Moreover and as for the normal TRs (TR1 and TR2), any no-current detection of the essential TR causes the automatic call of the ELEC DC page on the R ECAM display unit in advisory mode (the essential TR current indication flashes in green, Ref. 24-00-00, P. Block 1).

B. DC BUS TIE Contactor Circuits
In flight configuration, this contactor closes as soon as the aircraft is energized.
In ground service configuration (when external power is supplying the A/C network), this contactor is open except in the case of APU starting.
It is controlled
- by a current sensor which protects the essential network from a short circuit on the normal busbar.
- by various logic conditions depending on the state of the normal AC distribution and on the autopilot.

R NOTE : As soon as the A/C is in ground service configuration and supplied
R by external power, the Reverse Current Sensor function is disabled
R by DC BUS TIE contactor opening through its de-energized coil.
R This will inhibit a probable short term reverse current which
R might activate the reverse current sensor.

It opens automatically :
- if high reverse current is detected in the direction 3PP to 1PP
- in case of loss of the two normal busbars 1XP and 2XP (emergency and smoke emergency configurations).
- when both autopilots are selected to LAND mode.

NOTE : This open condition is necessary to obtain category III autoland capability.



DC Essential Generation - Control and Indicating Diagram
Figure 003

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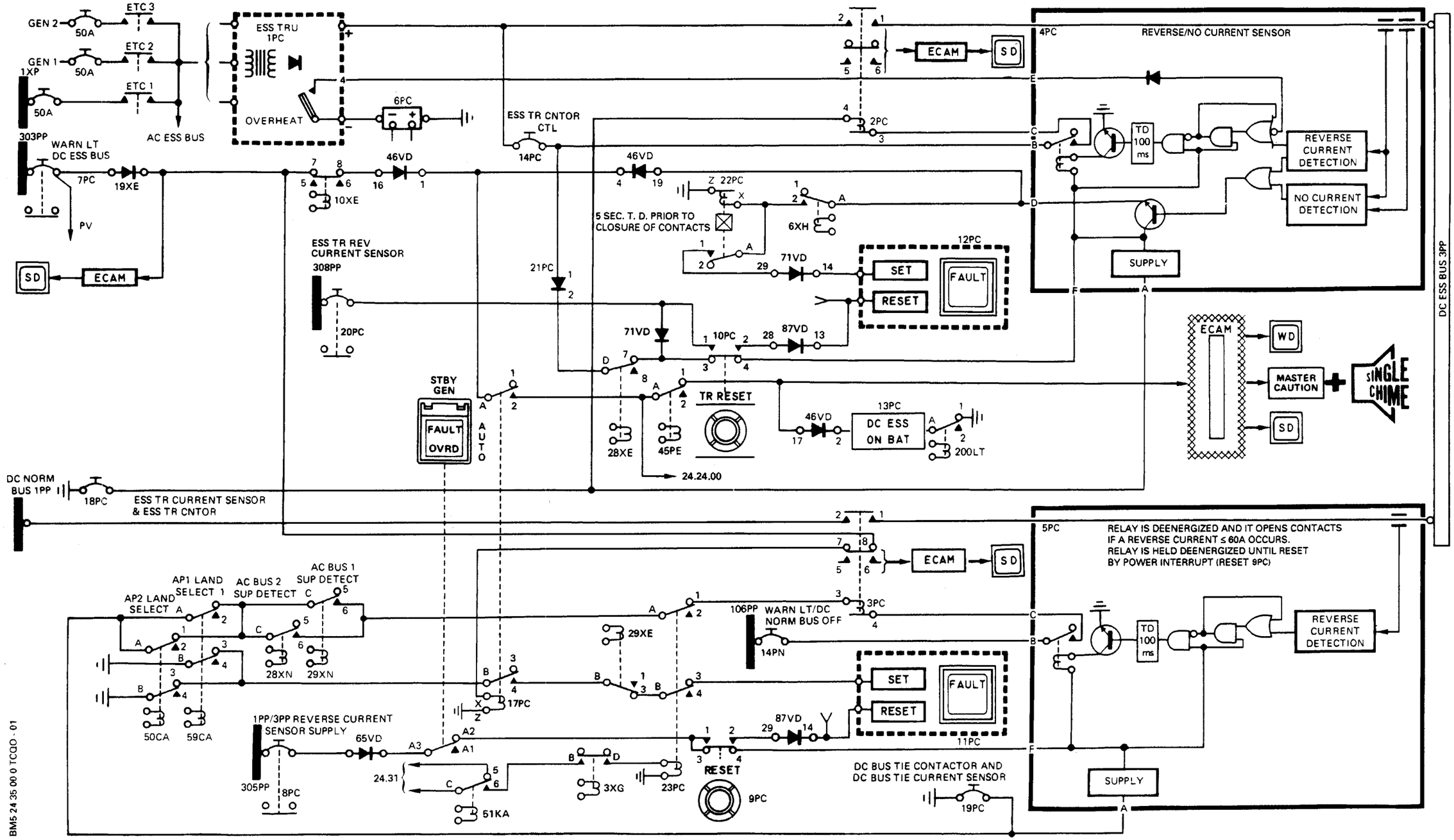

DC Essential Generation - Control and Indicating
Schematic
Figure 004

R

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On the maintenance panel :
- **DC BUS TIE CONTACTOR** memorized fault annunciator indicates that the contactor has opened.

NOTE : - The indication is inhibited if the opening is controlled by the **AP** conditions.
- It is no longer operational (loss of supply) in emergency and smoke emergency configurations.

- **ELEC PWR/RESET** pushbutton switch enables system resetting and indicating, in case of protection tripping.

C. Essential Generation Loss Warning Circuit

(1)In case of loss of the **3 AC** sources, the standby generator is automatically selected and supplies the essential busbar directly. **No** warning specific to this generation is activated.

(2)In case of loss of the **DC** source
- no current from the essential **TR**
- **DC BUS TIE** contactor open

The batteries are automatically connected and supply the essential busbar. **ELEC PWR/DC ESS ON BAT** amber warning light comes on and triggers the **ECAM** system.
It informs the crew that the flight time in this configuration is limited, considering the capacity of the batteries.
A message is displayed on the **L ECAM** display unit to inform the crew that the standby generator must be selected by pressing **STBY GEN** pushbutton switch on **ELEC PWR** panel **424VU** (pushbutton switch pressed (in) and **OVRD** legend on).

R Essential busbar supply from the standby generator causes :
- batteries uncoupling
- extinguishing of **ELEC/ PWR/DC ESS ON BAT** warning light
- deactivation of the **ECAM** system.

The standby generator provides a power supply without any time limit.

DC MONITORING AND INDICATING

1. General

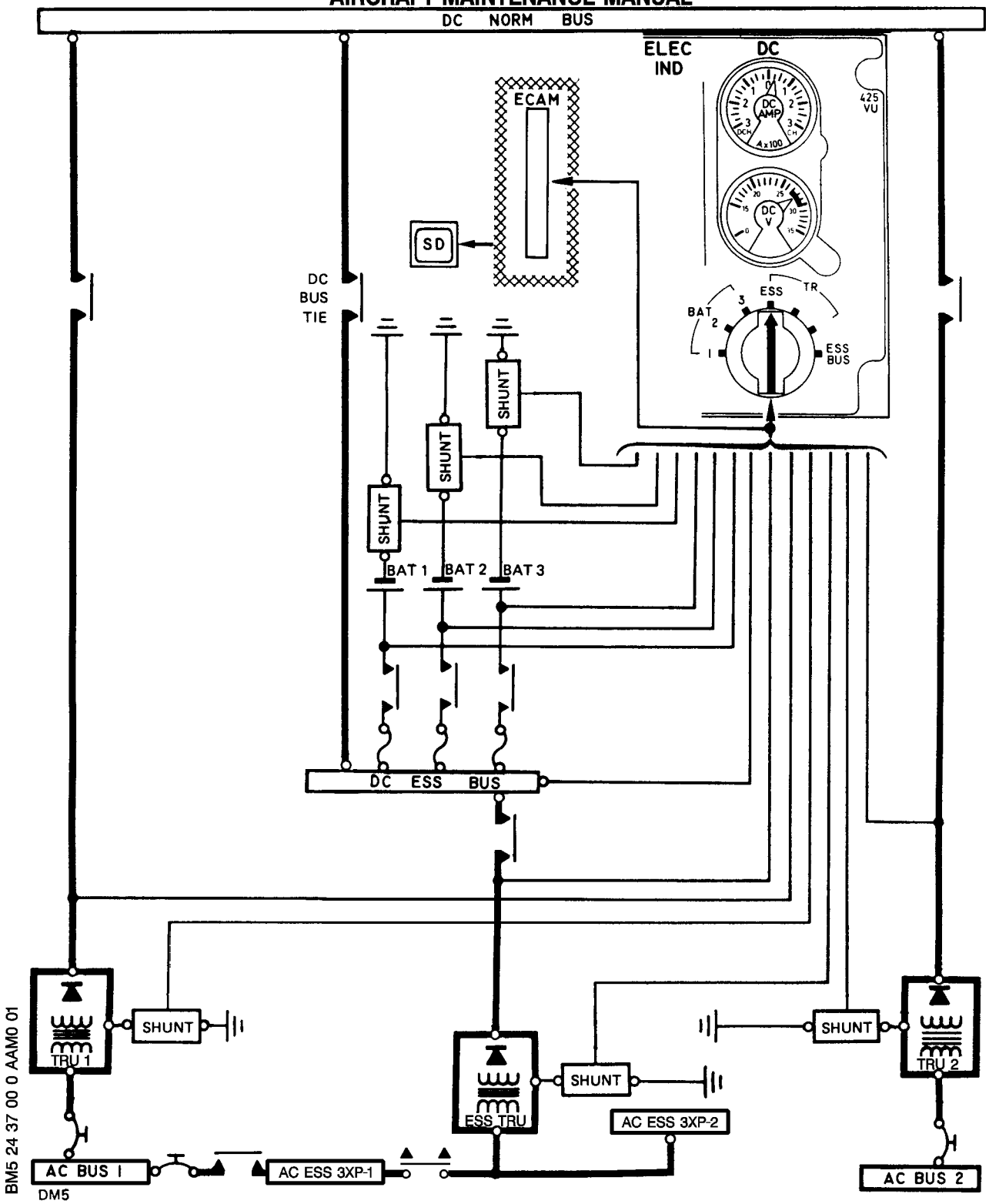
Monitoring and indicating of aircraft DC generation and distribution are performed by means of the voltmeter and ammeter located on flight compartment overhead panel (Ref. Fig. 001, 002)
A DC parameter selector enables selection of data displayed on these indicators :
- voltage and charge/discharge current of each battery
- voltage and current of each TR
- voltage of the essential busbar.

It should be noted that all these data are also displayed on the ECAM display unit.

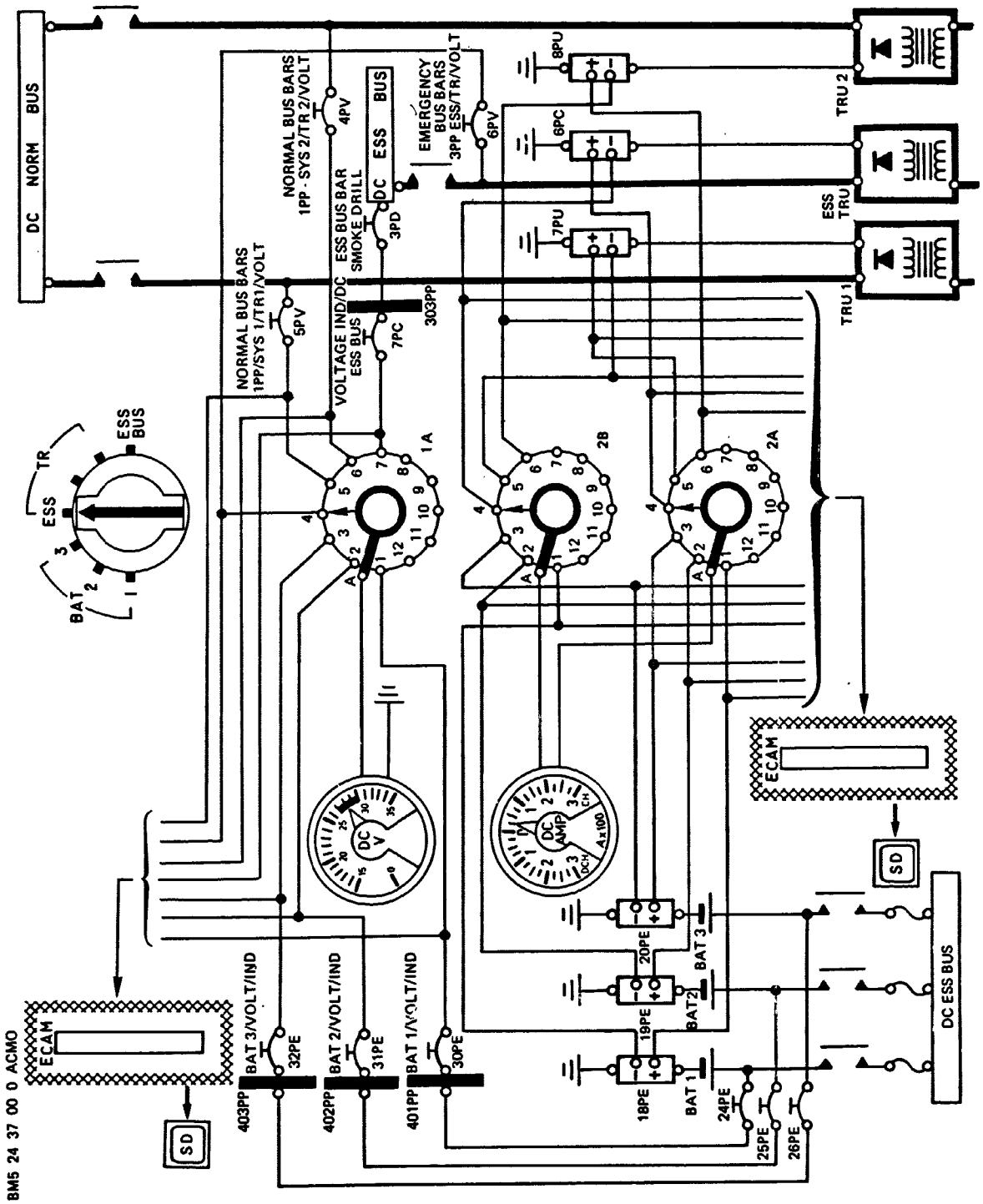
2. Component Location

(Ref. Fig. 003)

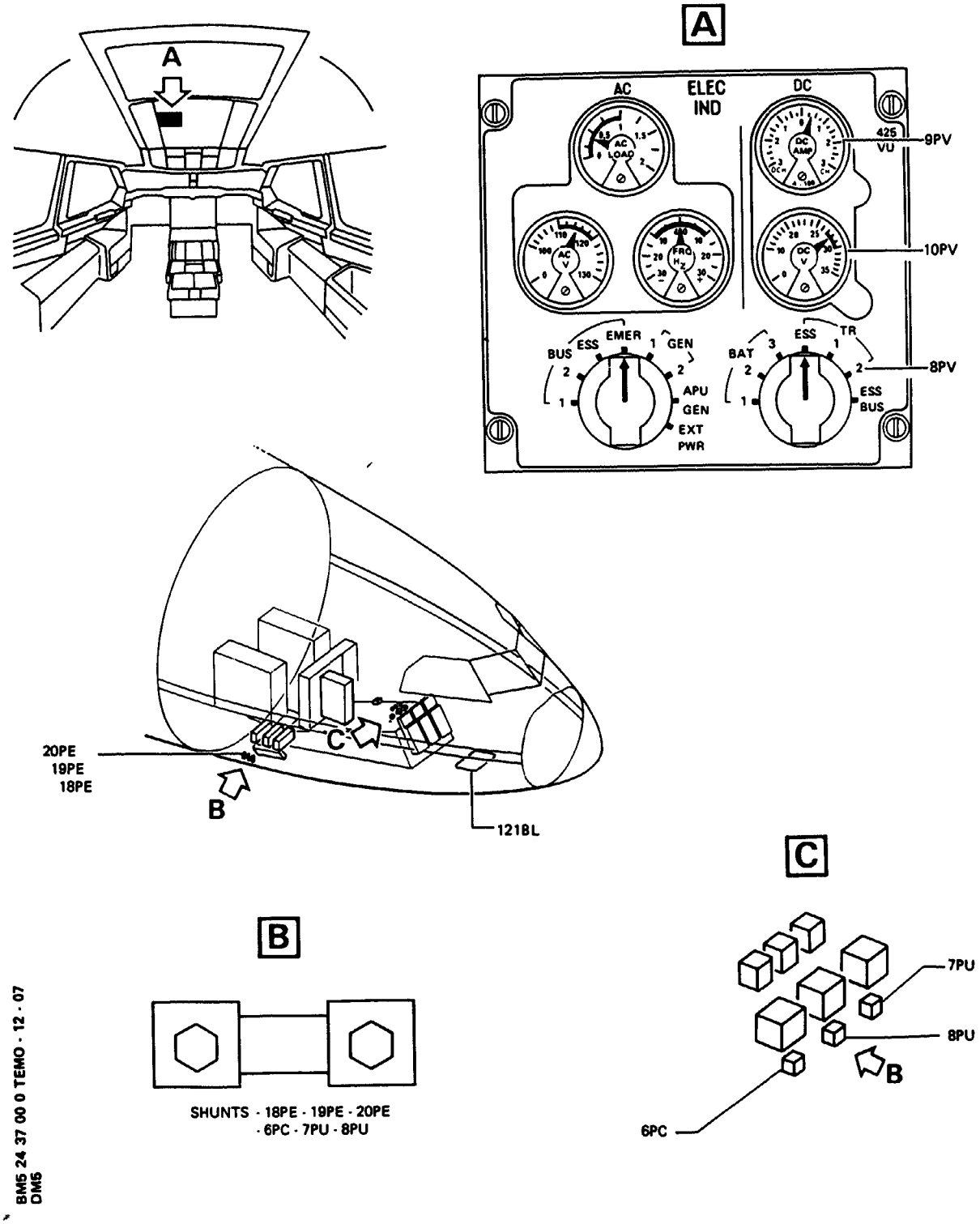
	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	18PE	SHUNT-BAT1		122	121BL	24-31-00
	19PE	SHUNT-BAT2		122	121BL	24-31-00
	20PE	SHUNT-BAT3		122	121BL	24-31-00
	6PC	SHUNT-ESS TR		122	121BL	24-35-00
R	7PU	SHUNT-TR1		122	121BL	24-32-41
R	8PU	SHUNT-TR2		122	121BL	24-32-41
	8PV	SWITCH-DC PARAMETER SEL	425VU	211		24-37-00
	9PV	AMMETER-DC	425VU	211		24-37-00
	10PV	VOLTMETER-DC	425VU	211		24-37-00



DC Generation - Monitoring and Indicating Diagram
Figure 001



DC Generation - Monitoring and Indicating Electrical Circuit
Figure 002



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DC Monitoring and Indicating - Component Location
Figure 003

1. Operational Test

A. Reason for the Job
To check operation of the DC generation annunciator lights.

B. Procedure
(1)Job set-up
(a)Do not supply the aircraft electrical network.
(2)Test

ACTION	RESULT
On panel 424VU : 1. Press the three BAT pushbutton switches.	On panel 424VU : - the flowbars of the three BAT pushbutton switches come on - DC NORM BUS OFF and DC ESS ON BAT warning lights come on - other annunciator lights come on which must not be taken into account.
2. Press and release the three BAT pushbutton switches.	On panel 424VU : - all lights go off.

2. Functional Test

A. Reason for the Job
To check operation of the DC generation indicating.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct
(c)Make certain that ECAM circuit breakers are closed and activate the R and L ECAM display units.
(d)Select ELEC DC page.
(e)Make certain that the following circuit breakers are closed :

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN1 TR1 SUPPLY	19PU	GEN1/B11
106VU	TR1 CONTROL	15PU	A15
133VU	ELEC/AC BUS 2/WARN/RELAY	8XN	335/R83
133VU	ELEC/AC BUS 1/WARN/RELAY	9XN	335/R78
133VU	ELEC/TR2 CTL/NORM	9XX	335/V85

(2)Test

ACTION	RESULT
1. On panel 425VU - place DC parameter selector switch successively in BAT1, 2 and 3 positions.	On panel 425VU, DC section - on indicators, check battery voltage and load or unload current. On R ECAM display unit - check that these indications correspond with those of panel 425VU.
2. On panel 424VU - press BAT OVRD pushbutton switch.	On panel 424VU - ON legend of BAT OVRD pushbutton switch comes on - the flowbars of the three BAT pushbutton switches come on. On R ECAM display unit - check that these indications correspond with those of panel 424VU.

ACTION	RESULT
- press and release **BAT OVRD** pushbutton switch.	On panel 424VU - **ON** legend of **BAT OVRD** pushbutton switch goes off - the flowbars of the three **BAT** pushbutton switches go off.
3. On panel 425VU - place **DC** parameter selector switch in **TR1** position.	On panel 425VU, **DC** section - check voltage and current on indicators. On **R ECAM** display unit - check that these indications correspond with those of panel 425VU.
4. On circuit breaker panel 101VU, **GEN1** section and 106VU - open **TR1 SUPPLY** circuit breaker 19PU. - open **TR1 CONTROL** circuit breaker 15PU.	On panel 425VU, **DC** section - no indication must be displayed on indicators. On **R ECAM** display unit - check correspondence with panel 425VU.
5. On panel 425VU - place **DC** parameter selector switch in **TR2** position.	On panel 425VU, **DC** section - check voltage and current on indicators. On **R ECAM** display unit - check correspondence with indications on panel 425VU.
6. On circuit breaker panel 133VU, open following circuit breakers : - 8XN ELEC/AC BUS 2/WARN/RELAY - 9XN ELEC/AC BUS 1/WARN/RELAY - 9XX ELEC/TR2 CTL/NORM.	On panel 424VU, - **DC NORM BUS OFF** warning light comes on (**AC BUS 1 OFF AND AC BUS 2 OFF** warning lights also come on). On panel 425VU, **DC** section - no indication must be displayed on indicators. On **R ECAM** display unit - check correspondence with indications on panels 424VU and 425VU. On **L ECAM** display unit - "ELEC **DC NORM BUS OFF**" appears. On **CAPT** and **F/O** main instrument panels 3VU and 5VU - **MASTER CAUTION** lights come on.

R
R
R

	ACTION	RESULT
		The single chime sounds.
	7. On panel 425VU - place DC parameter selector switch in TR ESS position.	On panel 425VU, DC section - check voltage and current on indicators. On R ECAM display unit - check correspondence with indications on panel 425VU.
R	8. On panel 106VU Open following circuit breakers : - 14PC ESS TR CTL - 18PC ESS TR & DC BUSTIE CNTR - CRT SENS	On panel 425VU, check that : - only the TR ESS current is lost. - the batteries supply ESS BUS.
R	9. On panel 424VU - open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend of OVRD SUPPLY 1 pushbutton switch comes on - DC ESS ON BAT warning light comes on - other annunciator lights come on which must not be taken into account. On panel 425VU, DC section - no indication must be displayed on the indicators. On R ECAM display unit - check correspondence with indications on panels 424VU and 425VU. On L ECAM display unit "ELEC DC ESS BUS ON BAT" appears. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. The single chime sounds.
	- press and release OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend of OVRD SUPPLY 1 pushbutton switch goes off - DC ESS ON BAT warning light goes off. On panel 425VU - check voltage and current on indicators.
R R		NOTE : Check that there is no current at TR ESS.

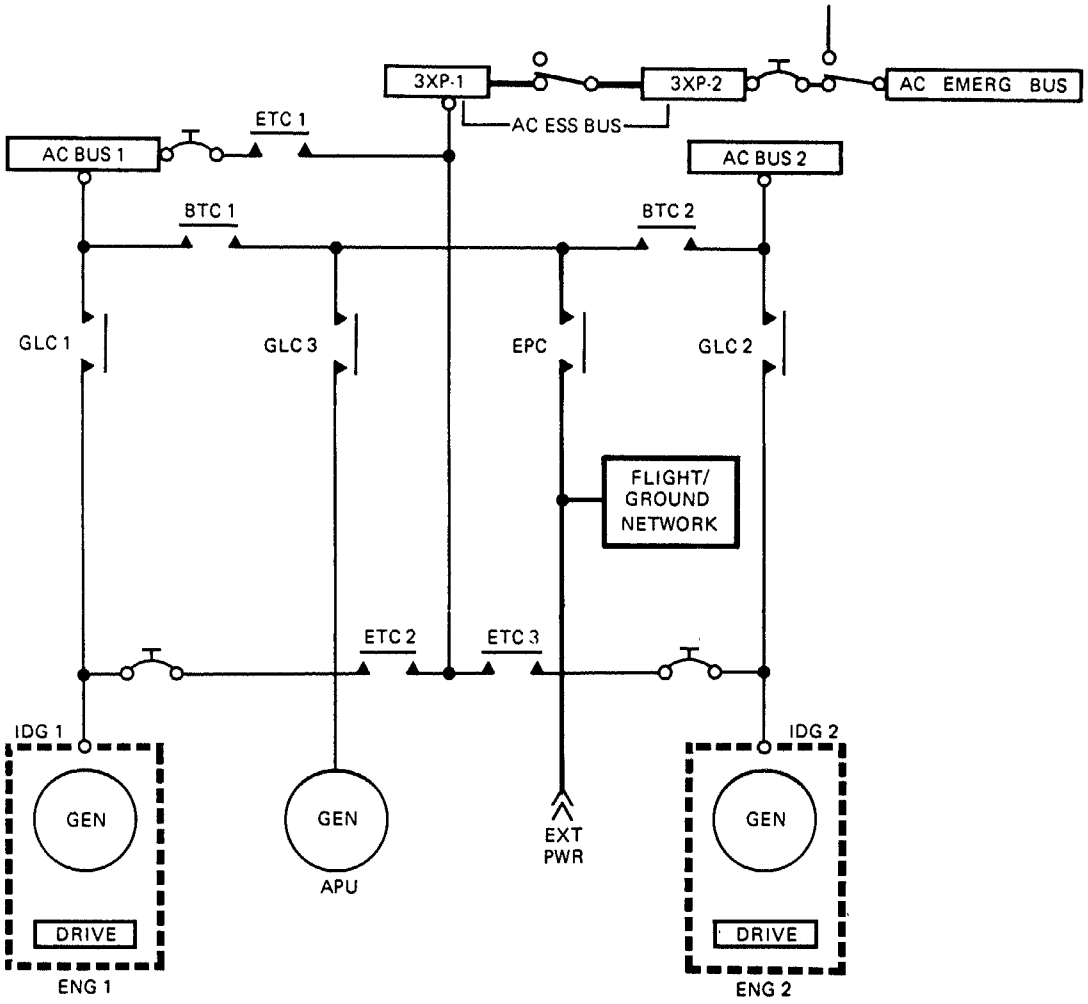
	ACTION	RESULT
R	10.On circuit breaker panels 101VU, 106VU and 133VU, - close circuit breakers 15PU, 19PU, 8XN, 9XN and 9XX.	On panel 424VU - all annunciator lights and warnings go off. On panel 425VU - no change.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating conditions.

EXTERNAL POWER

The aircraft network supply by a ground power unit is effected by means of an external power receptacle located aft of the nose landing gear well.
This receptacle enables the supply of :
(Ref. Fig. 001)
- either the whole network by means of the transfer circuit (Ref. 24-41)
- or only part of the network (flight/ground network) for ground service operations (Ref. 24-42).

For location of the main components :
(Ref. Fig. 002)



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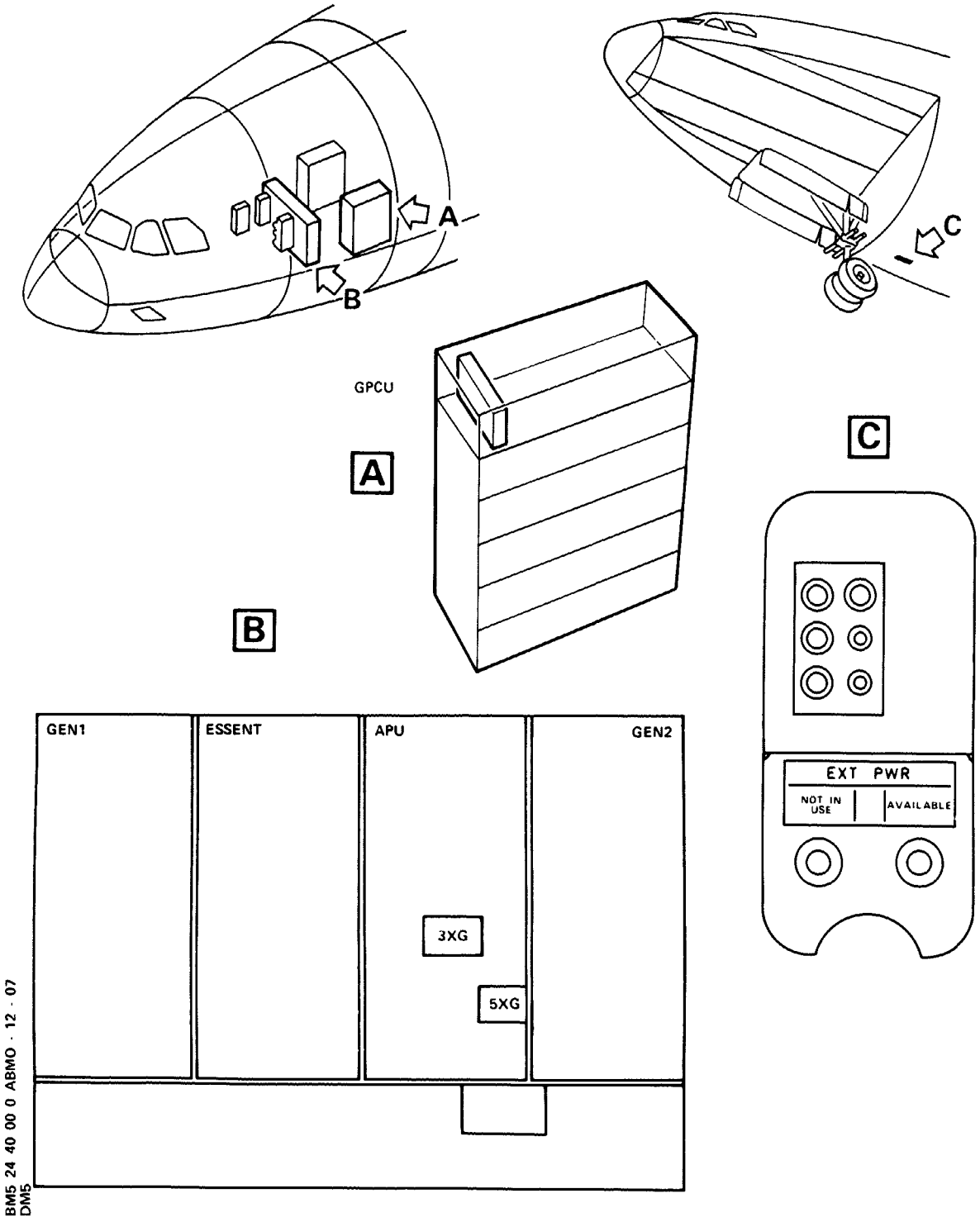
External Power
Figure 001



External Power - Location
Figure 002

AC EXTERNAL POWER CONTROL

1. General

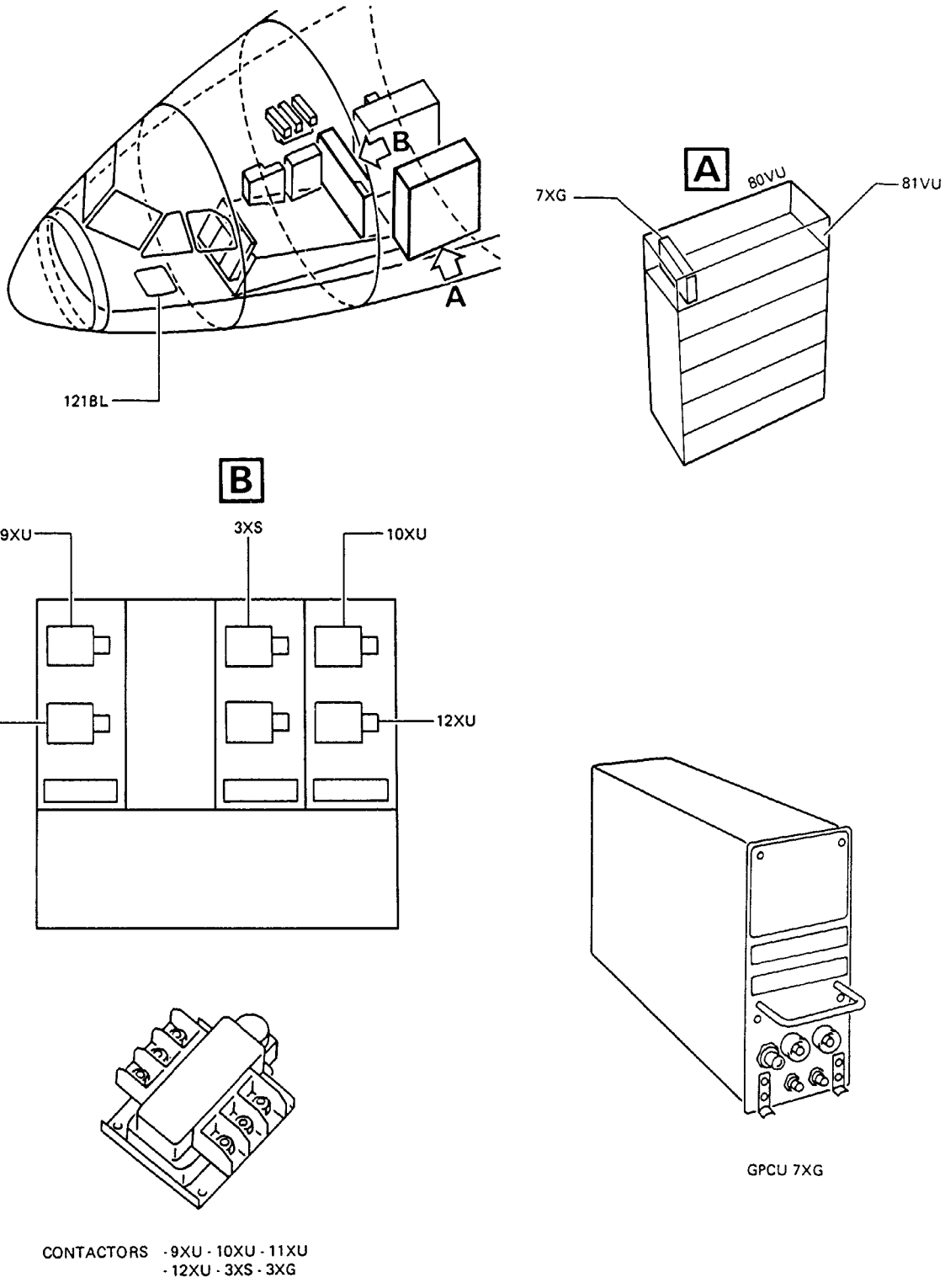
The power supply control of the whole aircraft network from a ground power unit is carried out from the flight compartment overhead panel.
This control is associated to a Ground Power Control Unit (GPCU) which monitors permanently the quality of the electrical power supplied.
In addition, and to facilitate maintenance operations, the GPCU comprises :

- a self-monitoring system and a Built In Test Equipment in relation with its proper functions
- a test control and data display facility related to the whole aircraft normal, auxiliary and external generations.

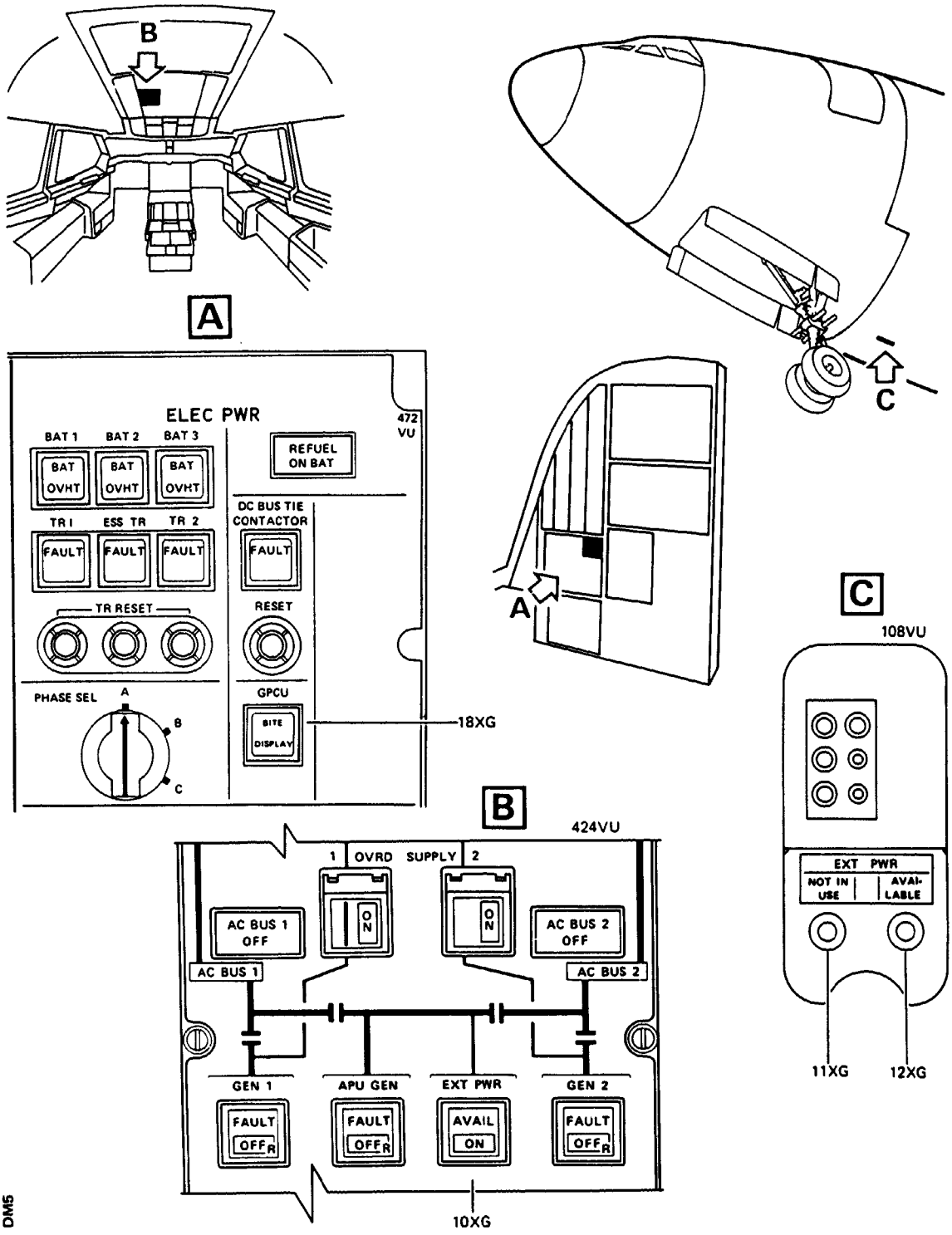
2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
3XG	CNTOR-AC EXT PWR	101VU	121	121BL	24-41-12
7XG	GPCU	81VU	121	121BL	24-41-11
10XG	P/BSW-EXT PWR	424VU	211		24-41-00
11XG	INDICATOR LIGHT-EXT PWR NOT IN USE	108VU	122		24-41-00
12XG	WARNING LIGHT-EXT PWR AVAIL	108VU	122		24-41-00
18XG	MFA-GPCU	427VU	212		24-41-00
3XS	CNTOR-APU GEN PWR LINE	101VU	121	121BL	24-23-13
9XU	CNTOR-GEN1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR-TRANSFER, SYS1	101VU	121	121BL	24-22-18
12XU	CNTOR-TRANSFER, SYS2	101VU	121	121BL	24-22-18



AC External Power Control - Avionics Compartment - Location
Figure 001



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AC External Power Control - Control and Indicating - Location
Figure 002

3. Control and Indicating Circuits

With the ground power unit connected and selected ON (generator excited and external tie contactor closed), the GPCU analyzes the voltage delivered at the external power receptacle (Ref. Fig. 003).
(Ref. Fig. 004)

A. Controls and Indications in the Flight Compartment

If the analyzed parameters are correct, the GPCU controls the illumination of the green AVAIL legend of EXT PWR pushbutton switch located in the flight compartment overhead panel.
This pushbutton switch controls the energization of the transfer network by means of the External Power Contactor (EPC) :

- pushbutton switch released out : the EPC remains open.

NOTE : Nevertheless, the ground power unit may supply the ground and flight
R ground networks in ground service configuration (forward panel,
R Ref. 24-42).

- pushbutton switch pressed in : the EPC closes and supplies the transfer circuit. The effective supply of the aircraft network by means of the BTC(s) depends on the availability of the onboard main generation sources (Ref. NOTE below).
  This position of the control is maintained electromagnetically and trips in case of fault detection by the GPCU.
  It should be noted that once it is pressed in, AVAIL legend goes off and the blue ON legend below comes on to indicate the closure of the EPC.
  of the EPC.

NOTES : - In the case of APU generator already supplying the transfer circuit, the supply command by means of the external power receptacle causes the opening of APU generator line contactor.
- For reference only, each aircraft network is supplied according to the following priority order :
  . by its generator
  . by the ground power unit
  . by the APU generator
  . by the second generator (Ref. 24-22).

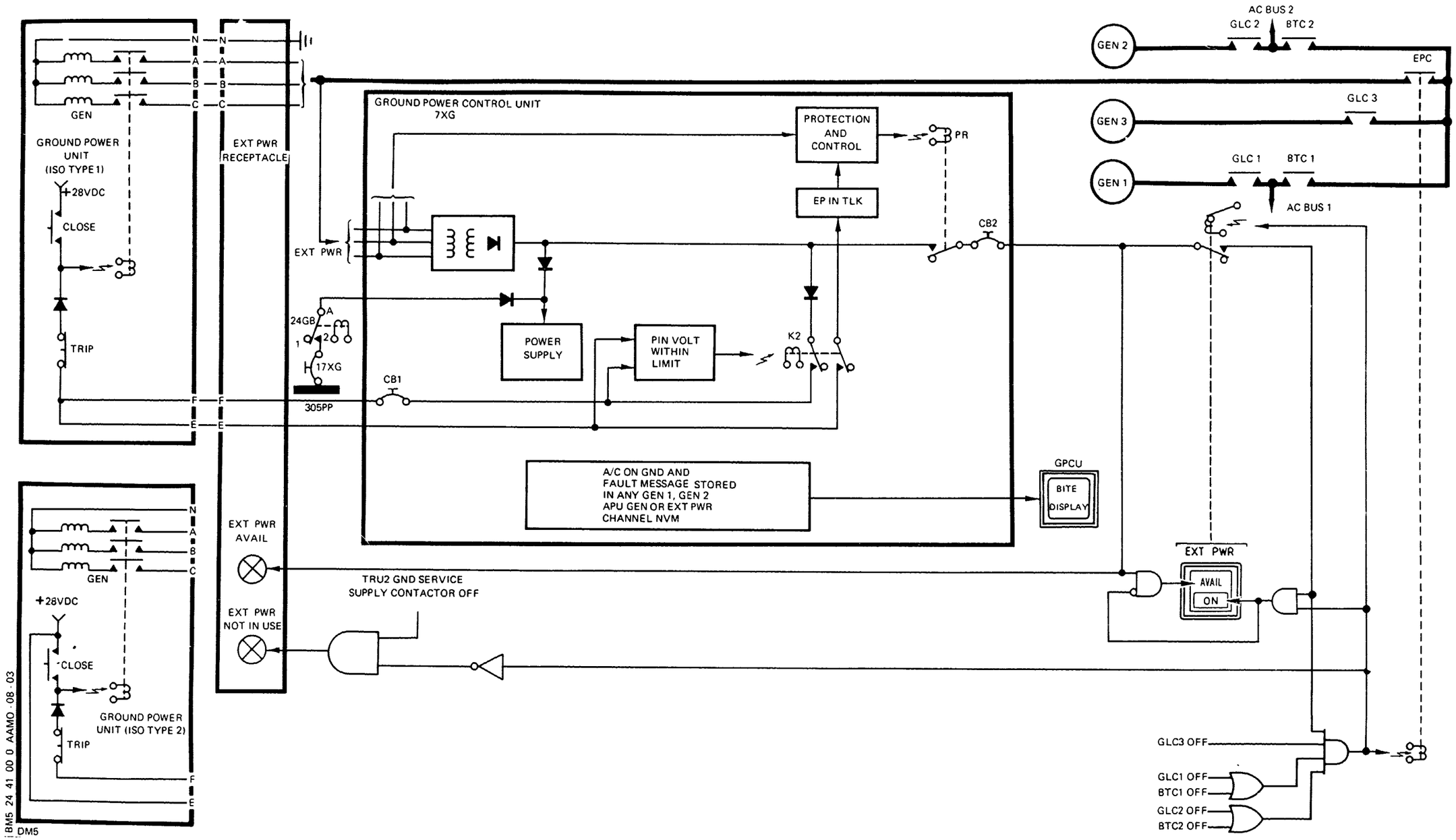
On the maintenance panel, BITE DISPLAY fault memorized annunciator indicates, when activated, that a fault has been detected and memorized on any aircraft normal, auxiliary or ground generation. This annunciator is controlled by the GPCU, and the data related to the analyzes fault can be displayed on the alphanumeric display window located on the face of the GPCU (Ref. para. C. (3)).

B. Indications in the External Power Receptacle Housing

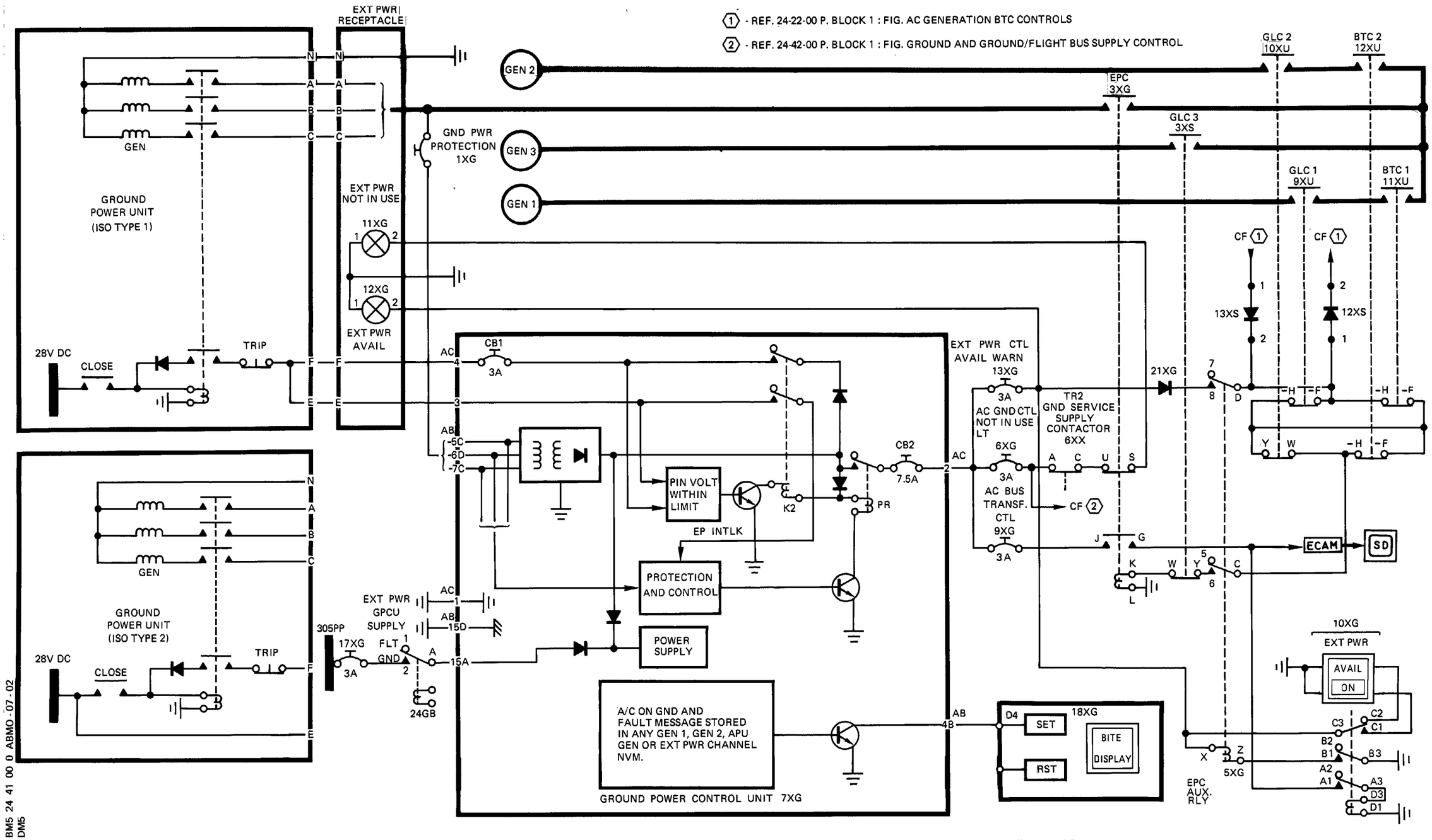
Two annunciator lights located in the external power receptacle housing enable easier utilization or removal of the ground power unit by the ground personnel.

- amber EXT PWR AVAIL warning light controlled by the GPCU, comes on to indicate that the ground power unit is operating and the voltage correct
- white EXT PWR NOT IN USE indicator light comes on to indicate that the ground power unit does not supply the aircraft and can be disconnected.

C. General Operating Principle of the GPCU (Ref. Fig. 005, 006)



Control and Indicating
Figure 003



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Control and Indicating
Figure 004

The GPCU has three different functions :
- aircraft power supply command and network protection,
- system test and self-monitoring relating to these functions
- control of the test and data display relating to the aircraft normal, auxiliary or ground generation assembly.

Most of these functions are achieved by digital circuitry.
The introduction of the digital system built-up around the INTEL 8085 system has permitted the integration of a test and failure diagnosis facility, thus considerably facilitating maintenance operations.

(1)Aircraft supply control and network protection

This control has an action on the EPC by means of the PR relay.
The PR is in turn controlled by the signals received or processed by the control unit :
- the ground power unit is connected and set into operation
- over/undervoltage
- over/underfrequency
- incorrect phase order
- GPCU self-detected fault (monitoring of the digital).

Any fault detection prevents the ground power unit from being connected to the aircraft network, or causes its tripping if already in line.

NOTES : - When detecting a fault, the PR cancels ELEC PWR/EXT PWR push-button switch self-latching.
- The PR also controls the illumination of AVAIL legend at the flight compartment and EXT PWR AVAIL warning light in the external power receptacle housing.

(2)System test and self-monitoring

This function may be divided into several parts each very different :
- test and analyze after the triggering of a protection,
- detection of a passive failure,
- maintenance test.

(a)Test and analyze resulting from the triggering of a protection

When a protection is triggered (active failure), the control unit :
- identifies the protection which has caused the generator tripping,
- analyzes the conditions in which the tripping has occurred,
- then, after analyzing, determines the origin of the fault (control unit, wiring or ground power unit).

All these data are stored in a non volatile memory.
On the ground, they can be displayed on an alphanumeric display window located on the face of the GPCU (Ref. para. (3)).

(b)Passive fault detection

Certain passive faults which do not cause protection triggering, may affect the system operation.
The control unit monitors permanently the majority of the circuits concerned. When detecting a fault, the control unit determines its origin and stores these data in a non volatile memory.
As for the previous case, the data may be displayed on the alphanumeric display window on the face of the control unit (Ref. para (3)).

(c)Maintenance test

It can only be performed on the ground, and completes, to a certain extent, the monitorings already described.
The test is performed by exciting (stimuli) the concerned circuits and

analyzing the response.
It is controlled :
- either automatically and periodically, every seven flights,
- or manually.
The result of the test is stored in non volatile memory and may be displayed on the alphanumeric display window (Ref. para. (3)).

(3)Test and display controls
They are activated directly from the face of the control unit (Ref. Fig. 006, 007) by means of pushbutton switches :
- **FAULT ISOLATE,** which enables :
  . the reading of messages stored in the non volatile memories of the GPCU and three GCUs, and particularly those stored after a fault detection
  . then, the display of the message on the 24 digit alphanumerical display located above
- **PERIODIC TEST** : which controls the maintenance test of each of the four control units and displays the result on the control unit display
- **MEMORY CLEAR,** which controls the erasure of the data stored in the non volatile memories of the four control units.

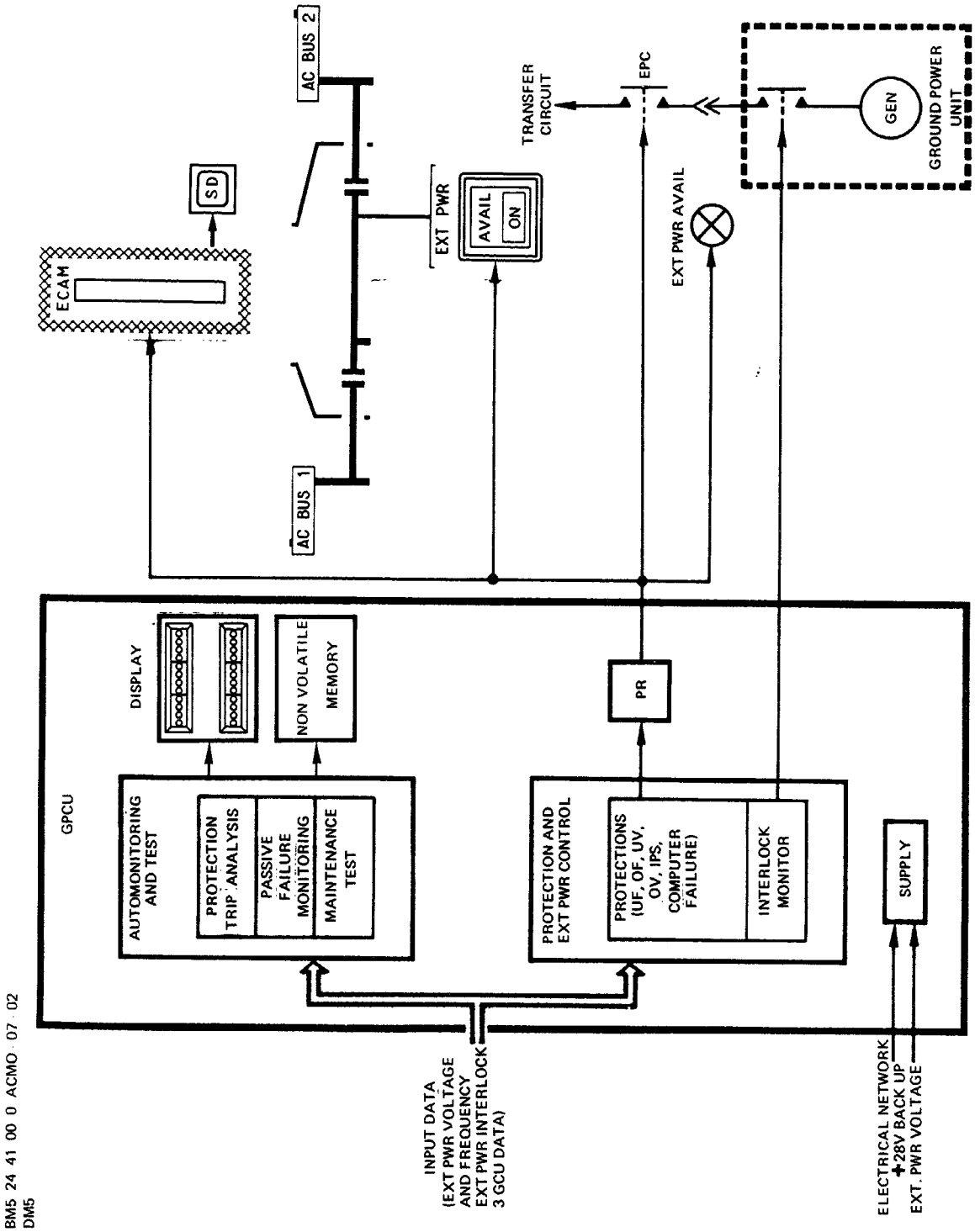
Control or data exchanges between the GPCU and each GCU are performed by means of a bidirectional serial data link. Finally, and in order to satisfy "on condition" requirements, the maintenance test of the control unit is initialized automatically every seven (7) flights.
It should be noted that :
- the GCUs can only communicate with the GPCU and not between them,
- the communication between the GPCU and any one of the GCUs can be performed on the ground only. All the communications are inhibited in flight,
- the GPCU controls the activation of **ELEC PWR/GPCU/BITE DISPLAY** annunciator on the maintenance panel when a fault has been detected and stored by any one of the four control units.

4. Ground Power Control Unit (GPCU)
The GPCU has three different functions :
- aircraft supply control and network monitoring
- self-monitoring and test of the system corresponding to these functions
- control of the test and data display in relation with the whole normal, auxiliary or ground aircraft generations.

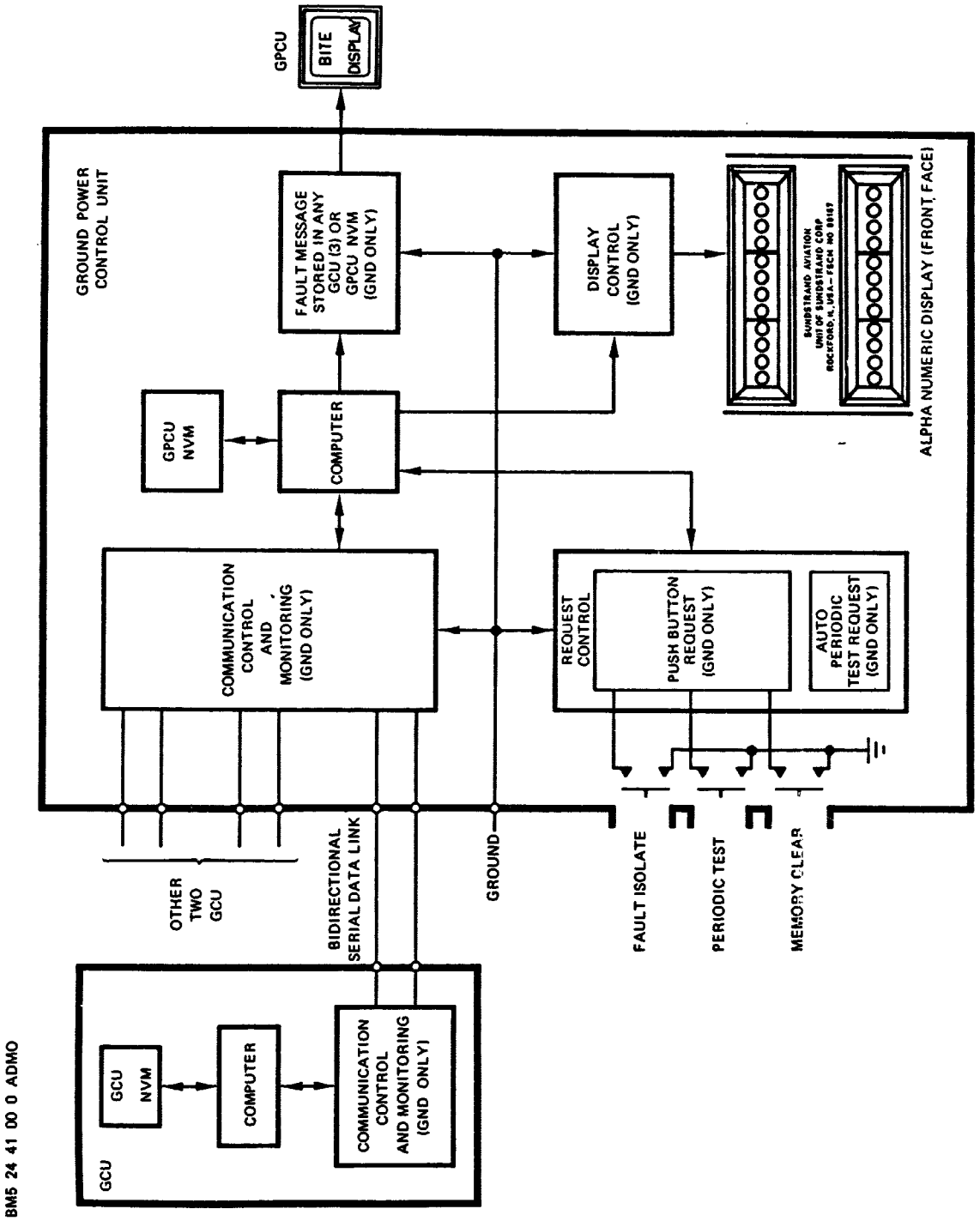
Most of these functions are achieved by digital circuitry.

A. Control Unit Supply
The control unit is supplied (Ref. Fig. 004, 008)
- with 115 V, 400 Hz, directly from the external power receptacle, by the voltage it has to analyze.
  The GPCU generates 28 VDC from this voltage. It is used :
  . for its own needs (internal ± 15 V, ± 5 V and -28 V supply)
  . to supply the aircraft power supply control and indicating circuits (EPC, ..., flight/ground network contactors, ...).
- with 28 VDC from the normal aircraft electrical network and on the ground only.

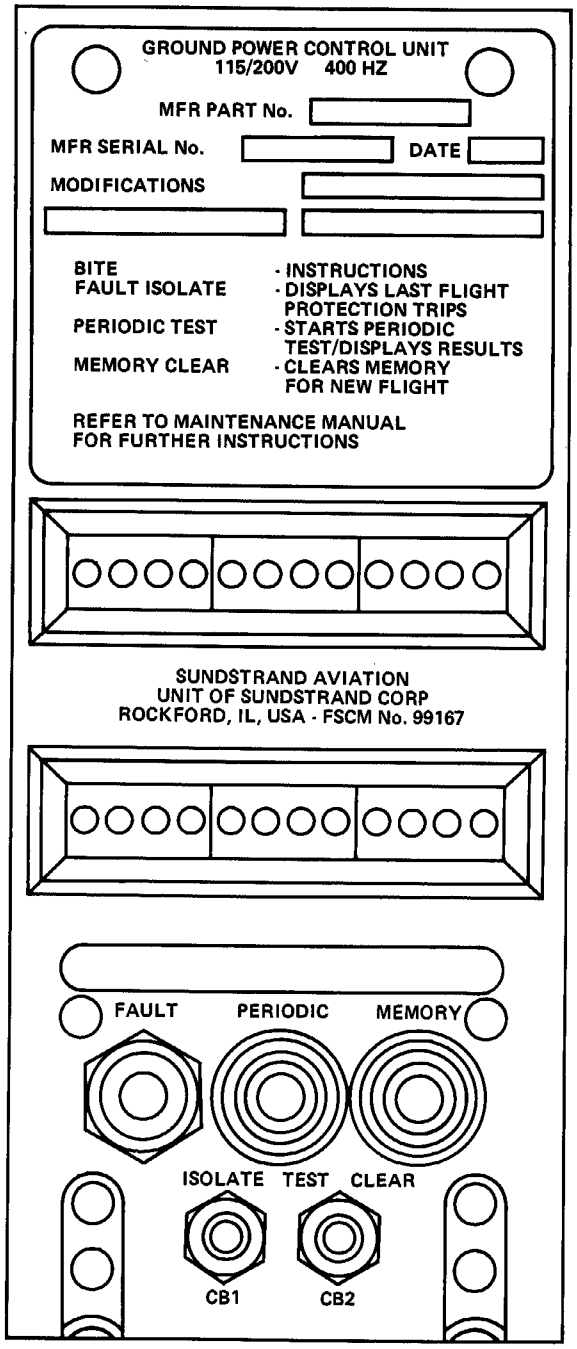
This dual supply constitutes the 28 V internal supply, peculiar to the



Ground Power Control Unit Block - Diagram
Figure 005



Test and Display Control
Figure 006



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Ground Power Control Unit
Figure 007

control unit.

B. Aircraft Supply Control and Protection Functions
The aircraft supply control and protection functions are essentially performed by means of the PR relay.
The PR relay is itself controlled by a microcomputer which processes the various data which are necessary to the generation of the controls and protections.
It should be noted that the monitoring facility of the auxiliary contact pins of the external power receptacle (terminals E and F) has a joint action on the control by means of relay K2.
NOTE : The microcomputer also organizes the self-monitoring and test of the system(s).

(1)Protections (Ref. Fig. 008)

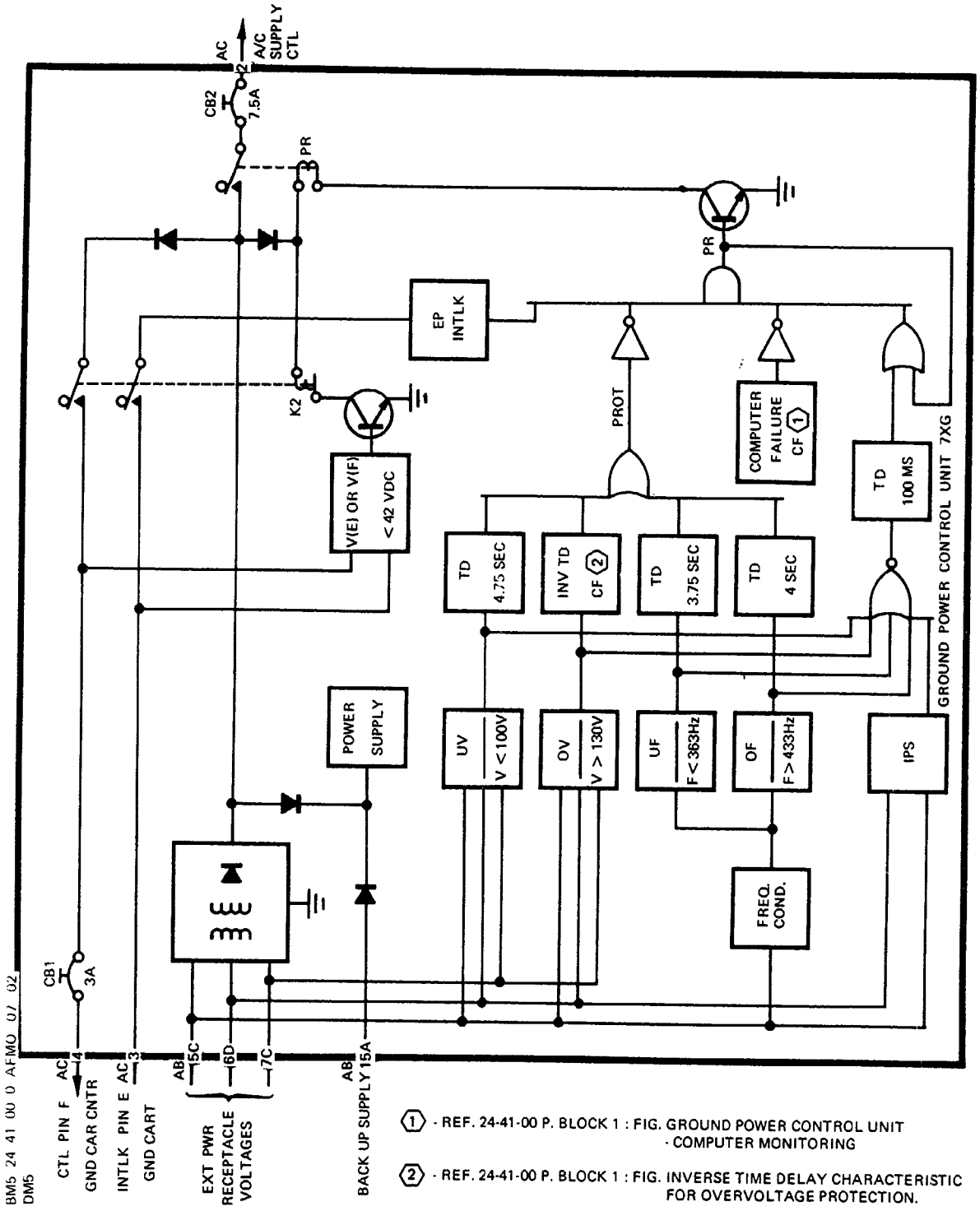
(a)Over/underfrequency (OF, UF)
The control unit monitors permanently the frequency of phase A voltage of the external power receptacle.
The over/underfrequencies are triggered when the frequency becomes higher/lower than a certain threshold.

(b)Over/undervoltage (OV, UV)
The control unit monitors permanently the voltage of the three phases of the external power receptacle.
The undervoltage is triggered when the voltage of the lower phase becomes lower than a certain threshold.

(c)Incorrect phase order (IPS)
This detection is performed from voltage information of phases A and B of the external power receptacle.
After excitation of the ground power unit generator, the control unit analyzes the phase order of the voltage it supplies, and when incorrect, prevents the closure of the PR relay (protection of the three phase consumers).
NOTE : This protection is effective in case of inverted connection between any two phases and also in case of inversion between a phase and the neutral.

(d)Control unit fault (Ref. Fig. 009)
The control unit processes all its functions in a sequential and periodical mode and according to a predetermined program.
Once the system initialized, all the operations are performed during a so-called "major" cycle, which comprises essentially :
- the control and protection functions,
- the system test and self-monitoring functions, together with the control function of the whole onboard generation and display.

The correct development of the program is monitored by two distinct means :
- a monitoring enabling the detection of a discrepancy in the periodical development of the program (watch dog one shot), and which, in case of fault causes the aircraft supply tripping (PR)
- a monitoring enabling the detection of soft failures, and which, in case of fault, causes a total re-initialization of the system. Nevertheless, the detection of six faults of the type within one second is considered as a hard failure and also causes the aircraft



(1) - REF. 24-41-00 P. BLOCK 1 : FIG. GROUND POWER CONTROL UNIT - COMPUTER MONITORING

(2) - REF. 24-41-00 P. BLOCK 1 : FIG. INVERSE TIME DELAY CHARACTERISTIC FOR OVERVOLTAGE PROTECTION.

Ground Power Control Unit - Protections
Figure 008

supply tripping (PR).

NOTES : The protection function and aircraft supply control function are both processed by the control unit.
The monitoring of the program periodical development enables a fail-safe triggering of the system in case of fault detection by a direct analog control at the PR relay.
- Further to the triggering of that protection, the system can be reset by cutting off the ground power unit momentarily (EP INTLK).
- A test of the majority of the control unit fault detection circuits is automatically performed on the ground when the control unit is energized and lasts 20 sec when the test develops normally.

(2)Monitoring of the ground power unit connection
This function is performed by analog circuits.
The control unit monitors permanently the voltage at auxiliary terminals E and F on the external power receptacle.
If the voltage is not within the permissible limits, relay K2 cuts off the ground power unit (the ground power unit generator contactor is latched Ref. Sheets 2 and 6).

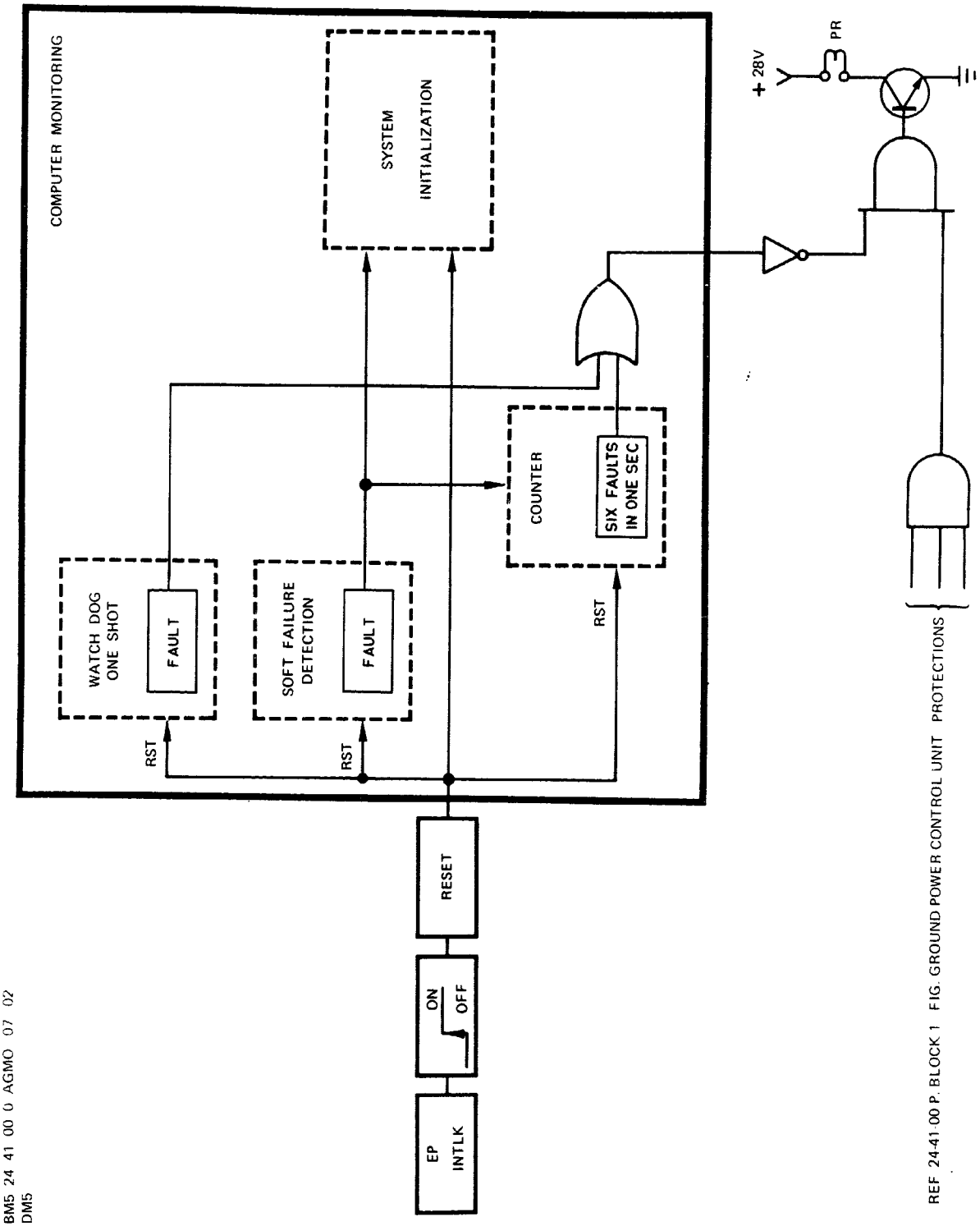
(3)GPCU operation in normal use

(a)Initial energization of the ground power unit
As soon as the ground power unit is connected to the aircraft and set into operation (EP INTLK) the GPCU is supplied and analyzes the voltage supplied.
If the voltage is correct (voltage, frequency, phase order), the PR relay allows the aircraft supply 100ms after.

(b)Aircraft supplied by the ground power unit
Upon triggering of one of the protections, UV, OV, UF, OF control unit fault, and after the associated timing, the control unit commands the supply cutoff by opening of the PR relay.
The defective connection of the ground power unit causes its immediate cutoff.

NOTES : - The momentary opening of the PR prevents ELEC PWR/EXT PWR pushbutton switch from being latched and thus cuts off supply to the aircraft by the ground power unit.
- After the triggering of one of the protections, the PR will close automatically :
. as soon as the fault will disappear,
. or after a momentary cutoff of the ground power unit (EP INTLK) if all the parameters are correct when set again into operation.

C. System Test and Self-Monitoring of Data Relating to the Whole Onboard Generation(BITE Function)
The function of the BITE is :
- to identify any protection causing ground power unit tripping (active failure) and determine the origin of the failure (GPCU, ground power unit, wiring or peripherals)
- to detect and isolate any passive failure
- to store a record of the failures (active or passive failures) and of



Ground Power Control Unit - Computer Monitoring
Figure 009

their cause in the Non Volatile Memory of the GPCU to determine whether the aircraft begins a "new flight", and if it is the case, store the fact in the GPCU NVM
- as soon as the aircraft is on the ground, to activate GPCU BITE DISPLAY MFA on maintenance panel if any of the control unit (GCUs or GPCU) has recorded a failure message during the current flight
- to display the failure messages on the alphanumeric display window located on the face of the GPCU for maintenance purpose (by pressing FAULT ISOLATE pushbutton switch on the GPCU) (Ref. Fig. 007)
- to carry out if required by the maintenance personnel (by pressing PERIODIC TEST pushbutton switch on the GPCU) (Ref. Fig. 007), a GPCU circuitry verification test and to display the results on the GPCU alphanumeric display window
- to enable every seven (7) flights an automatic periodic test when the aircraft is on the ground.

NOTE : FAULT ISOLATE and PERIODIC TEST functions are only available with aircraft on the ground.

(1)Identification and isolation of any protection causing tripping of the ground power unit.

In case of ground power unit tripping, the GPCU BITE :
- determines first the nature of the protection which has caused the tripping (by testing the program parameters associated to the various protections)
- then, by testing the GPCU circuit corresponding to this protection, localizes the failure having initiated the protection : failure internal to the GPCU or ground power unit, or failure at system wiring level.

Two failure messages are generally generated in case of ground power unit tripping :
- one message indicates the nature of the protection having caused the tripping
- the other message indicates the localization of the failure having initiated the protection procedure.

These messages are coded and the codes are recorded (as soon as they are generated) in the GPCU NVM.

They can be displayed on an alphanumeric display window located on the face of the GPCU (by pressing FAULT ISOLATE pushbutton switch, also located on GPCU face), if required for the maintenance.

Messages can only be displayed with aircraft on the ground.

(2)Detection and isolation of the passive failures.

Some passive failures which do not trip the ground power unit, can affect the system operation. The GPCU BITE monitors permanently most of the circuits concerned.

The monitored circuits deal with :
- PR relay
- GPCU circuit breakers and associated circuitry
- GPCU supplies
- phase sequence order
- the auxiliary terminals on the external power receptacle
- serial data links (from GPCU to each of the 3 GCUs).

As soon as a passive failure is detected by the GPCU BITE, the code of

the BITE message corresponding to that failure is generated and recorded in the GPCU NVM.
This message can be displayed on the GPCU display window, together with the messages associated to the active failures, if required by the maintenance personnel (by pressing FAULT ISOLATE pushbutton switch on the GPCU, aircraft on the ground).

(3)Non Volatile Memory ; list of the messages generated by the BITE.
The codes of the messages generated by the GPCU BITE are stored in a Non Volatile Memory (NVM), i.e. the data is kept even when supply to the GPCU is cut.
The NVM is organized as follows :
(Ref. Fig. 010)
There are 64 storage locations of 8 bits (1 word) each.
Each of the two last locations has a particular function :
- location 63 is the BITE message memory : the data stored inside will indicate whether the GPCU has recorded (in locations 1 to 62) a failure message code during the flight, and thus permit the GPCU BITE DISPLAY MFA located on the maintenance panel to be activated when necessary
- location 64 is a flight counter used to indicate how many flights have been logged since the last periodic automatic test. This data is necessary to initiate the periodic automatic test every seven fligths (Ref. para. 8)
- the 62 other locations (1 to 62) are used to store failure message codes and control codes for the NVM.

The list of messages generated by the GPCU BITE and which can be displayed on the alphanumeric display window of the GPCU is given below in sub-paragraphs (a), (b), (c).

NOTE : Any GPCU internal failure is indicated by an implicit message of the type : "GPCU FAILED CODE XX", XX being the code of the message (in hexadecimal). But any defect external to the GPCU (and thus internal to the ground power unit or affecting the wiring or connections) is indicated by an explicit message.

(a)Messages generated in case of tripping of a protection (Ref. para. (1)).

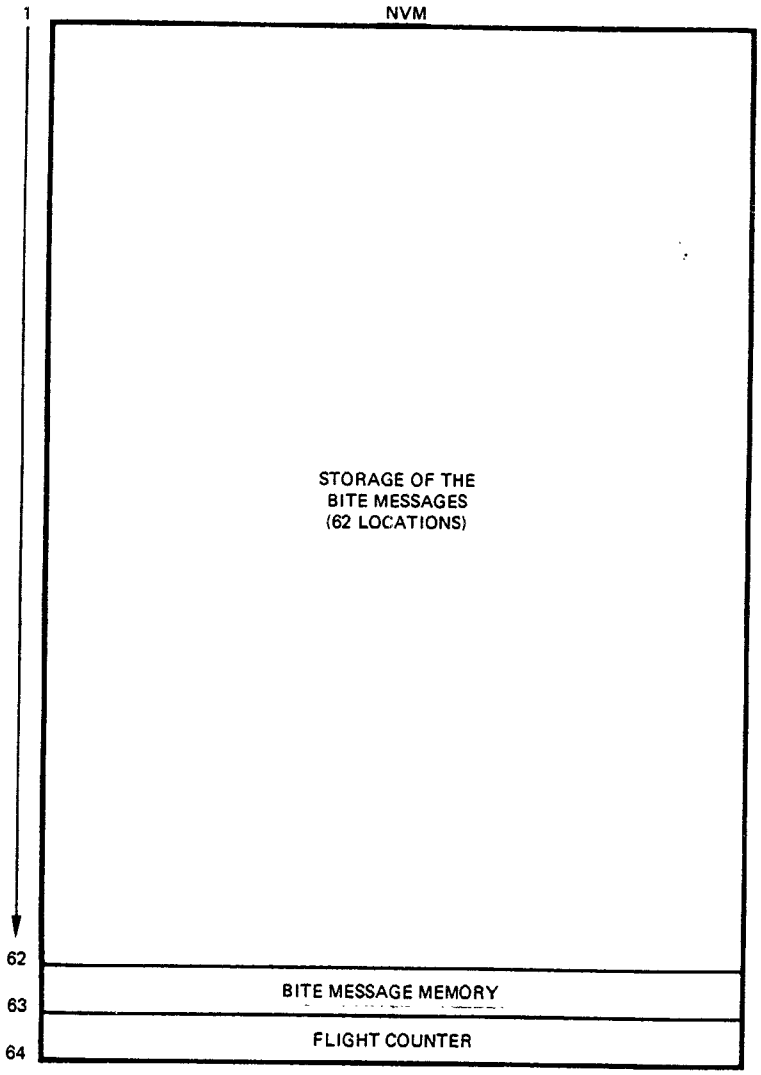
1 Messages precising the type of protection having caused the tripping.

CODE (IN HEXADECIMAL)	MESSAGE DISPLAYED
DA	UNDER FREQ TRIP
DB	OVER FREQ TRIP
DC	UNDER VOLT TRIP
DF	OVER VOLT TRIP

These messages appear explicitly.

2 Messages indicating the localization of the failure having activated the protection.

. Failures internal to the GPCU



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Non Volatile Memory
Figure 010

R	CODE	NATURE OF THE FAILURE
	B5	FREQUENCY SENSE
	B7	VOLTAGE SENSE
	C1	PROCESSOR FAILURE
	C2	WATCHDOG PROTECTION
	C3	BITE BYPASSED = 3 TRAP FLAG
	C4	BITE BYPASSED - BACKGROUND
	C5	NVM FAILED
	C6	BITE CURRENTLY BYPASSED
R	94	POWER SUPPLY AVERAGE
R	95	CIRCUIT BREAKER SENSE
R	96	AC ON CIRCUIT BREAKER
R	98	PHASE SEQUENCE SENSE
R	9A	SLOW A/D
R	9B	+5V POWER
R	9C	EP INTERLOCK MONITOR
R	9D	EP INTERLOCK SENSE
R	9E	A/D GROUND TEST

The messages are displayed under the form :
"GPCU FAILED CODE XX" because they correspond to GPCU internal failures.
.. Failures external to the GPCU

CODE	MESSAGE DISPLAYED
C7	WRONG EP PHASE SEQUENCE
CC	CIRCUIT BREAKER 2 OPEN
CE	NO EXT PWR INTERLOCK
DD	EXT POWER UNDER VOLT
DE	EXT POWER FAULTY

The messages are displayed explicitly because they correspond to GPCU external failures.
NOTE : In case of protection activation, two messages are generally displayed on the GPCU display window :
- a message indicating the nature of the protection having caused the tripping (Ref. (a) 1)
- a message indicating the localization of the failure having initiated the protection sequence ; the failure is either internal to the GPCU (Ref. 2.), or external to the GPCU (Ref. 2..).

Only the three messages coded : C7, CC and CE ("WRONG EP PHASE SEQUENCE", "CIRCUIT BREAKER 2 OPEN", and "NO EXT PWR INTERLOCK") may appear without any other message.

(b)Messages generated in case of passive failure detection (Ref. para. (2)).

1 Failures internal to the GPCU.

	CODE	NATURE OF THE FAILURE
	94	POWER SUPPLY AVERAGE
	95	CIRCUIT BREAKER SENSE
	96	AC ON CIRCUIT BREAKER
	97	PR OR PR AUX
	98	PHASE SEQUENCE SENSE
	99	SERIAL LINK LOOP BACK
	9A	SLOW A/D
	9B	+5V POWER
	9C	EP INTERLOCK MONITOR
	9D	EP INTERLOCK SENSE
	9E	A/D GROUND TEST
R	C0	FIRE SWITCH SENSE
R	C1	PROCESSOR FAILURE
R	C2	WATCHDOG PROTECTION
R	C3	BITE BYPASSED = 3 TRAP FLAG
R	C4	BITE BYPASSED - BACKGROUND
R	C5	NVM FAILED
R	C6	BITE CURRENTLY BYPASSED

These message are displayed under the form :
"GPCU FAILED CODE XX" because they correspond to GPCU internal failures.

2 Failures external to the GPCU.

	CODE	MESSAGE DISPLAYED
R	C7	WRONG EP PHASE SEQUENCE
R	C8	LEFT SERIAL LINK
R	C9	RIGHT SERIAL LINK
R	CA	APU SERIAL LINK
R	CC	CIRCUIT BREAKER 2 OPEN
R	CE	NO EXT PWR INTERLOCK
R	CF	CT LOOP GROUND
R	DE	EXT POWER FAULTY

These messages are displayed explicitly because they correspond to GPCU external failures.

(c)Messages which can be generated only during periodic tests, manually initiated (Ref. para. (7) or automatic (Ref. para. (8).

	CODE	NATURE OF THE FAILURE
	80	PHASE C VOLTAGE SENSE
	81	PHASE B VOLTAGE SENSE
	82	PHASE A VOLTAGE SENSE
	83	EP INTERLOCK SENSE
	84	AIR/GROUND SWITCH
	85	PHASE SEQUENCE SENSE
	86	FREQUENCY SENSE

These messages are displayed in the form :
"GPCU FAILED CODE XX" because they correspond to GPCU internal failures.

(4)Definition of a flight and flight logging.
A "flight flag" (command code FE) enabling flight logging (Ref. para. (3)) is stored in location 64 of the GPCU NVM each time a new flight begins.
One flight is defined as follows (principle) :
new flight : aircraft landing followed by at least one engine shutdown, then by both engines running.
The purpose of the "flight flag" is to partition the BITE message code stored in the NVM thus forming groups of codes, one per flight, the NVM can store up to seven (7) groups of BITE message codes (one group for the current flight and the six others for the six preceding flights) ; each corresponding message assembly may be displayed on the alphanumeric display of the GPCU if required by the maintenance personnel (by pressing FAULT ISOLATE pushbutton switch on the GPCU).

(5)GPCU BITE DISPLAY MFA
As soon as the aircraft touches the ground, at the end of the flight, communication is established between the GPCU and GCU (GCU1, 2 or 3).
NOTE 1 : As long as the aircraft flies, there is no communication between the control units.
NOTE 2 : There cannot be communication between two GCUs but only between one GCU and the GPCU.
During the communications each GCU transmits to the GPCU the data stored in location 63 of its NVM, and any BITE message record during the flight is thus indicated ; if it is the case for at least any of the three GCUs or if the GPCU has recorded a BITE message, GPCU BITE DISPLAY MFA (located on maintenance panel) is activated.

(6)Display of the failure messages.
If an active or passive failure of the electrical generation has occurred during a flight, the maintenance personnel is informed by the illumination of GPCU BITE DISPLAY MFA (Ref. para. (5)). It is then possible to know the nature of the failure(s) by pressing FAULT ISOLATE pushbutton switch on the face of the GPCU (this action has an effect with aircraft on ground only) ; when the pushbutton switch is pressed, each control unit transmits to the GPCU, the failure messages stored in its NVM (if applicable) via a serial data link connecting each GCU to the GPCU ; these message together with those stored in the GPCU NVM, are displayed on the GPCU alphanumeric display window in the order in which their codes have been stored in the NVM of the control unit (GCU1, 2 or 3 or GPCU).
When all the messages dealing with the current flight (i.e. the last flight) have been displayed, the messages which may have been stored during the preceding flight can be displayed by pressing again FAULT ISOLATE pushbutton switch. This can be repeated seven (7) times, each time the messages of the preceding flight being delt with (the NVM having a "7" flight capacity (Ref. para. (4)).
NOTE : For more details, refer to para. D. (Test and Display Controls) dealing with the pushbutton switches on the GPCU and the functions they initiate.

(7)GPCU circuitry verification test (periodic test) when PERIODIC TEST pushbutton switch on the face of the GPCU is pressed (this action has an effect with aircraft on ground and engines shut down), a verification test of the GCUs and GPCU circuitries is initiated to check for correct operation, at each control unit level, the BITE performs an end to end test of the control unit and all the anomalies detected by the test are displayed , in BITE message form, on the GPCU display window.
This test checks the following GPCU circuits :
- digital inputs/outputs
- current and voltage inputs
- frequency sense circuits.

The test consists in applying stimulis to the circuits concerned and analyzing their response.
The results of the test are stored in the NVM of the GPCU and joined to the data concerning the current flight.
The whole data (current flight + test) is then displayed in BITE message form on the GPCU alphanumeric display window.

(8)Automatic periodic test.
An automatic periodic test of the GCUs and GPCU is performed every seven (7) flights aircraft on the ground and engines shutdown.
Except for the initialization mode - automatic and every seven flights for the automatic periodic test, manual for the periodic test, the automatic periodic test is analogous to the periodic test :
- the same software and hardware are used for the test
- the same circuits are checked, i.e. for the GPCU :
  - digital inputs/outputs
  - current and voltage inputs
  - frequency sense circuits.

Moreover, if one or more failure messages are generated during the GPCU automatic periodic test, they are stored in the NVM of the GPCU but not displayed ; however, the maintenance personnel will be warned by GPCU BITE DISPLAY MFA on maintenance panel (this MFA is systematically activated when a failure message is recorded by any of the GCUs or GPCU.
As for the manual periodic test (Ref. para. (7)), the messages generated during the automatic periodic test are grouped with those dealing with the current flight and displayed together on the GPCU display window by pressing FAULT ISOLATE pushbutton switch on the GPCU.

NOTE : Whatever the result of the automatic periodic test may be, failure detected or not, a data appears on the display (if FAULT ISOLATE pushbutton switch is pressed), indicating that an automatic periodic test has been carried out at the end of the current flight. The data is displayed in the form : "AUTO PER TEST DONE THIS FLIGHT".

D. Control and Display of Data Relating to the Whole Onboard Generation
They are directly carried out from the face of the GPCU (Ref. Fig. 006, 007), using FAULT ISOLATE or PERIODIC TEST pushbutton switches.
The third pushbutton switch, MEMORY CLEAR, enables data recorded in GPCU

and GCUs NVMs to be cleared. In fact, the NVMs are not really erased pressing MEMORY CLEAR pushbutton switch has more precisely for result to inscribe in each NVM, a special command code FO in hexadecimal - preventing all the BITE messages the codes of which have been recorded before the code FO, from being read. The message "MEMORY HAS BEEN RESET" is besides displayed on the GPCU display window to inform the maintenance personnel of the reinitialization of the NVMs.

NOTE 1 : Initialization of any of the three functions "FAULT ISOLATE", "PERIODIC TEST" or "MEMORY CLEAR" is obtained by pressing the corresponding pushbutton switch for at least 250 ms.

NOTE 2 : The three functions are only available with aircraft on ground.

(1)FAULT ISOLATE pushbutton switch

If an active or passive failure of the electrical generation has occurred during a flight, the maintenance personnel is informed by the illumination of GPCU BITE DISPLAY MFA located on maintenance panel (Ref. para. C. (5)) ; the nature and origin of the failure(s) can be read by pressing FAULT ISOLATE pushbutton switch on the face of the GPCU (this action has an effect with aircraft on ground only) ; as soon as the pushbutton switch is pressed in each control unit transmits to the GPCU the failure messages stored in the NVM (if it is the case) via a serial data link connecting each GCU to the GPCU ; these messages together with those stored in the GPCU NVM, are displayed on the GPCU alphanumeric display in the order in which their codes have been stored in NVM of the control unit (GCU1, 2 or 3 or GPCU).

When all the messages dealing with the current flight (i.e. the last flight) have been displayed, the messages which may have been stored during the preceding flight can be displayed by pressing again FAULT ISOLATE pushbutton switch. This can be repeated seven (7) times, each time the message of the preceding flight being delt with (the NVM having a 7 flight capacity, Ref. para. C. (4)).

NOTE : Each failure message is displayed for 15 sec. ; the display rate can be accelerated by pressing FAULT ISOLATE pushbutton switch, each pulse calling the next message.

(2)PERIODIC TEST pushbutton switch

When PERIODIC TEST pushbutton switch on the face of the GPCU is pressed (this action has an effect with aircraft on ground and engines shutdown) a verification test of the GCUs and GPCU circuitry is initiated to check for correct operation : at each control unit level, the BITE performs an end to end test of the control unit and all the anomalies detected by the test are displayed in BITE message from, on the GPCU alphanumeric display window.

This test checks :

the following circuits for each GCU (1, 2 and 3) :

- digital inputs/outputs
- current and voltage inputs
- frequency sense circuits
- speed measurement circuits

the following GPCU circuits

- digital inputs/outputs
- current and voltage inputs
- frequency sense circuits.

The test consists in applying stimulis to the circuits concerned and analyzing their response.
The results of the test are stored in the NVMs of the control units and joined to the data concerning the current flight. The whole data (current flight + test) is then displayed in BITE message form on the GPCU alphanumeric display windows.
NOTE : Each failure message is displayed for 15 sec. ; the display rate can be accelerated by pressing FAULT ISOLATE pushbutton switch, each pulse calling the next message.
NOTE : If a periodic test is initiated with one GEN (GEN 1, GEN 2, or APU GEN) running, this periodic test is not performed for this GEN. The PERIODIC TEST DISABLED message then appears.

(3)BITE message display

(a)GPCU alphanumeric display window

All the messages (BITE messages indicating failures, titles and instruction messages) are displayed on the face of the GPCU through an alphanumeric display of 24 digits consisting in 6 modules of 4 digits each (Ref. Fig. 007).
Each digit :
- is composed of 16 LED
- can represent the following 64 letters, numbers or symbols. (Ref. Fig. 011)

(b)Display sequence

A message display sequence is initiated each time either FAULT ISOLATE or PERIODIC TEST pushbutton switch is pressed. The sequence develops in the following chronological order.

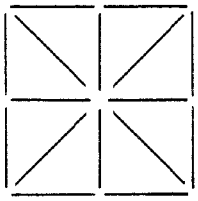
1 Test of the display window : prior to the display itself, all the LED of the display (16 LED for each of the 24 digits of the display, Ref. para. (a)) come on for 2 sec., thus enabling the maintenance personnel to check for correct operation.

2 Display of the flight number in the form :
- "LAST FLT LEG" if the display sequence concerns the messages dealing with the last flight (or current flight). The message is displayed for 2 sec.
- "FLT LEG - X" if the display sequence concerns a preceding flight, with X = 1 for the flight immediately preceding the current flight and up to X = 6 for the earliest flight for which BITE messages may have been recorded. The message is displayed for 2 sec.

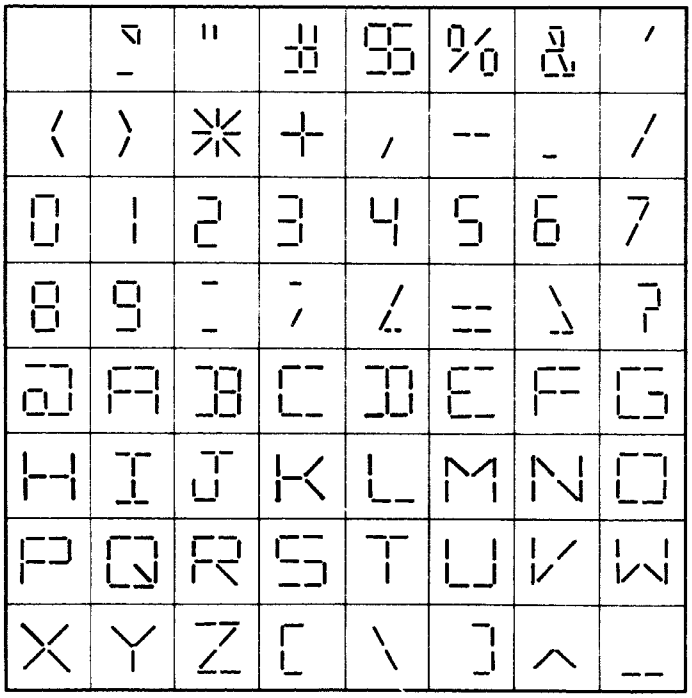
3 Display of the messages relative to the electrical generation by the ground power unit. The following appears in that order :
- "EXTERNAL POWER SYSTEM" for 2 sec. (title message).
- BITE messages (failure messages) stored in the NVM of the GPCU (the messages are listed in paragraph C. (3)).
- Each BITE message is displayed for 15 sec.
- If no message has been stored in the NVM of the GPCU, "OK" message appears for 2 sec.

4 Display of the messages relative to the LH channel of the generation (IDG1). The following appears in that order :
- "LEFT GEN POWER SYSTEM" for 2 sec. (title message)
- the BITE messages stored in the NVM of GCU1 (the messages are listed in 24-22, paragraph 2. C. (5) (c). Each BITE message is dis-

A



B



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BITE Message Display
Figure 011

played for 15 sec.
If no message has been stored in the NVM of GCU1, "OK" message appears for 2 sec.

5 Display of the messages relative to the RH channel of the generation (IDG2). The following appears in that order :
- "RIGHT GEN POWER SYSTEM" for 2 sec.
- the BITE messages stored in the NVM of GCU2, if applicable, otherwise "OK".

6 Display of the messages relative to the auxiliary channel of the generation (APU GEN). The following appears in that order :
- "APU GEN POWER SYSTEM" for 2 sec.
- the BITE messages of GCU3, if applicable, otherwise "OK".

7 Display during 15 sec. of the following instruction :
"FOR PREV FLT PUSH FI SW" (for previous flight push FAULT ISOLATE pushbutton switch).
Thus, the messages which may have been stored during the previous flight may be displayed (Ref. paragraph D. (1)).

NOTE 1 : Each failure message is displayed for 15 sec. ; the display rate can be accelerated by pressing FAULT ISOLATE pushbutton switch, each pulse calling the next message.

NOTE 2 : The display sequence of the messages relative to flight - 6 ("FLT LEG - 6") does not end with "FOR PREV FLT PUSH FI SW" but with "PREVIOUS FLT INVALID" which appears for 2 sec.

NOTE 3 : If the message being called are relative to a flight during which an automatic periodic test has been carried out the message : "PER TEST DONE THIS FLT" is displayed for 15 sec. further to "FLT LEG X" and prior to "EXTERNAL POWER SYSTEM".

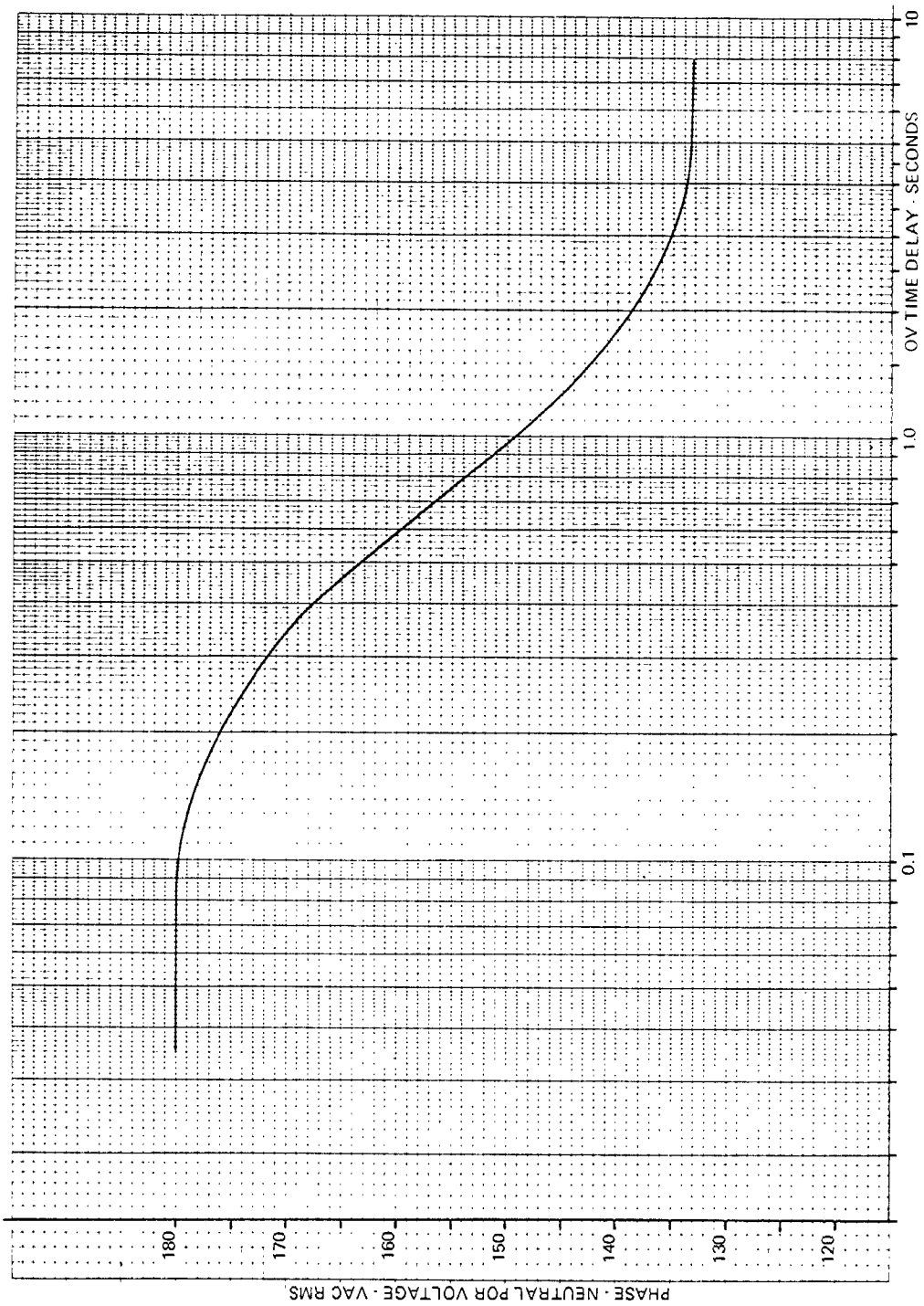
NOTE 4 : One GCU may not be able to communicate to the GPCU the content of its NVM. This occurs in case of :
- GCU not being power supplied
- loss of the connection between the GCU and GPCU due to the opening of the cables of the serial data link connecting the GCU to the GPCU.
- failure of the GCU microprocessor.

In that case, the following message : "NO RESPONSE FROM CONTROL" is displayed just after the title message, instead of the BITE message.

NOTE 5 : If FAULT ISOLATE pushbutton switch is pressed while the aircraft network has only its service busbars supplied via the ground power unit, the message "NO RESPONSE FROM CONTROL" appears thrice because no one of the three GCUs is then supplied.

E. General Characteristics
(Ref. Fig. 012)
References : Sundstrand P/N 735234A
Power supply : ref. para. 3.A.
Protections

FUNCTIONS	TRIGGERING THRESHOLD	TIMING	OBSERVATIONS



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Inverse Time Delay Characteristic for Overvoltage Protection
Figure 012

	- OF	430/436 Hz	3 - 5 sec.	PR relay opening
	- UF	360/366 Hz	3 - 5 sec.	PR relay opening
R	- OV	124 - 132 V	Inv. ID, Ref. Fig. 12	PR relay opening
	- UV	96/104 V	3 - 5 sec.	PR relay opening
	- IPS			Prevents PR relay closure
R	- Computer Failure	Ref. Fig. 9		PR relay opening
R	- Monitoring of terminals E and F	42VDC		K2 relay opening. Ground power unit cutoff.

1. Reason for the Job

A. Procedure for energization of the whole aircraft network.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200V, 400 Hz, 90 KVA
B. 98A24403000000	Cable Holding Strap
Referenced Procedure	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-15, P. Block 401	Receptacle - External Power

3. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Job Set-Up

(1)Make certain that the aircraft electrical ground is connected (Ref. 24-00-00, P. Block 301).

(2)Open door 121EL for access to the external power receptacle and panel 108VU.

(3)Make certain that the supporting strap with the snap hook is in position on the ground power unit feeder.

CAUTION : WHEN THE GROUND POWER UNIT CONNECTOR IS CONNECTED TO THE AIRCRAFT, ALL THE EFFORT OF SUPPORTING THE FEEDER MUST BE BORNE BY THE STRAP LINKED TO THE SUPPORT BY THE SNAP HOOKS SO AS TO PREVENT DAMAGE TO THE AIRCRAFT EXTERNAL POWER RECEPTACLE.

NOTE : Examine the external power supply cable and the external power receptacle before you do the connection.
If you find corrosion or damage, or if the pins are not aligned correctly, replace the external power receptacle (Ref. 24-41-15, P. Block 401).

(4)Support the feeder with the strap linked to the support by the snap hook.

(5)Connect the ground power unit.

WARNING : BEFORE YOU CONNECT THE GROUND POWER UNIT TO THE EXTERNAL POWER RECEPTACLE OF THE AIRCRAFT, MAKE SURE THAT THE EXTERNAL ELECTRICAL POWER SUPPLY IS NOT ENERGIZED. IF IT IS ENERGIZED, DANGEROUS ARCING CAN OCCUR.

R CAUTION : BEFORE YOU DO THE CONNECTION, MAKE SURE THAT THERE IS NO
R FOREIGN OBJECT OR FLUID IN THE CAVITIES OF THE GROUND POWER
R UNIT PLUG OR ON THE CONTACT PINS OF THE EXTERNAL POWER
R RECEPTACLE. THIS WILL PREVENT OVERHEAT OR DAMAGE TO THE
R EQUIPMENT.

(a)Connect the ground power unit connector to the aircraft external power

receptacle.

**ON A/C 001-100,

(6)On panel 438VU make certain that GND/COOL AUTO/CTL pushbutton switch is released

**ON A/C ALL

B. Energization of the Whole Aircraft Electrical Network
(1)On panel 424VU
- make certain that all pushbutton switches are released (out), except GEN 1, GEN 2 and APU GEN pushbutton switches.

(2)Start the ground power unit.
WARNING : BEFORE YOU START THE GROUND POWER UNIT, MAKE SURE THAT THE CONNECTOR OF THE GROUND POWER UNIT IS CORRECTLY CONNECTED TO THE EXTERNAL POWER RECEPTACLE. THERE IS A RISK OF ARCING IF THE CONNECTOR IS NOT CORRECTLY CONNECTED.
(a)Set ground power unit in operation (follow the instruction specific to the ground power unit).

(3)Correct operation of the protection circuit results in illumination :
(a)On panel 108VU, of EXT PWR/NOT IN USE and EXT PWR/AVAILABLE indicator lights.
(b)On panel 424VU, of AVAIL legend of EXT PWR pushbutton switch.

(4)On panel 424VU
(a)Press EXT PWR pushbutton switch :
- AVAIL legend goes off.

(5)Correct supply of the aircraft network is indicated by illumination :
(a)On panel 424VU, of :
- ON legend of EXT PWR pushbutton switch
- FAULT legend of GEN1 and GEN2 pushbutton switches
- OFF legends of BAT pushbutton switches.
- SHED legend of GALLEY pushbutton switch

(6)Make certain that electronics racks ventilation is correct.

- On overhead panel, check that FLOW legend of BLOWERS pushbutton switch is off on panel 438VU.

(7)On panel 424VU
(a)Press the three BAT pushbutton switches :
- OFF legends go off
- the flowbars come on.

C. De-energization of the Aircraft Electrical Network
(1)On panel 424VU
CAUTION : BEFORE PRESSING AND RELEASING EXT PWR PUSHBUTTON SWITCH, MAKE CERTAIN THAT THE THREE BAT PUSHBUTTON SWITCHES AND BAT OVRD PUSHBUTTON SWITCH ARE PRESSED AND RELEASED.
(a)Press and release the three BAT pushbutton switches :
- the flowbars go off (only if the battery is under charge)
- OFF legends come on.

(b)Press and release EXT PWR pushbutton switch :

- AVAIL legend comes on.

(2)Electrical power cut off is indicated by :

(a)On panel 424VU, extinguishing of :

- ON legend of EXT PWR pushbutton switch
- FAULT legends of GEN1 and GEN2 pushbutton switches.
- OFF legends of BAT pushbutton switches.
- SHED legend of GALLEY pushbutton switch

(b)On panel 108VU

- illumination of EXT PWR/NOT IN USE indicator light.

D. Close-Up

(1)Follow the instructions specific to the ground power unit to cut off electrical circuit supply.

WARNING : IT IS FORBIDDEN TO DISCONNECT THE GROUND POWER UNIT CONNECTOR WHEN THE CIRCUIT IS ENERGIZED AS THIS COULD CAUSE ARCING WHICH WOULD BE DANGEROUS FOR PERSONNEL, OR DAMAGE TO EQUIPMENT. CUT OFF THE ELECTRICAL SUPPLY BEFORE DISCONNECTING THE GROUND POWER UNIT CONNECTOR.

(2)On panels 108VU and 424VU, all pushbutton switches go off.

(3)Disconnect the ground power unit connector and disengage the snap hook from the support.

(4)Close access door 121EL.

1. Operational Test

A. Reason for the Job
To check the BITE function of GPCU - GCU system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz. 90 KVA
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Test of BITE - FAULT ISOLATE or PERIODIC TEST function.
(a)In avionics compartment, on GPCU 7XG :
- press and release FAULT ISOLATE or PERIODIC TEST pushbutton switch-
(b)The following sequence results :
1 All cursors come on
2 The display header "LAST FLT LEG" appears.
3 The display header "EXTERNAL POWER SYSTEM" appears
- if no fault occurred during the last flight, "OK" appears.
- if a fault or faults occurred, the first fault message appears and stays on for 15 sec.
Display then goes off
- if there is another fault on that channel the second fault appears and stays on for 15 sec. Display then goes off.
- if no other fault, next control unit header "LEFT GEN" appears.
- if no fault occured during the last flight, "OK" appears.
4 Faults saved in any of the control units follow the same display sequence as above. The units are polled in the following sequence
- GPCU "EXTERNAL POWER SYSTEM"
- LEFT GCU "LEFT GEN POWER SYSTEM"
- RIGHT GCU "RIGHT GEN POWER SYSTEM"
- APU GCU "APU GEN POWER SYSTEM"
5 When all faults have been displayed (if any), "FOR PREV FLT PUSH FI SW" will appear for 15 sec.
NOTE 1 : When pressing FAULT ISOLATE pushbutton switch locate on GPCU face, with aircraft service busbars supplied on the ground by the external power receptacle, "NO RESPONSE FROM CONTROL" appears three times because none of the three GCUS is then power supplied.

NOTE 2 : If the PERIODIC TEST has been conducted automatically "AUTO PER TEST DONE THIS FLIGHT" appears after "EXTERNAL

POWER SYSTEM" message.

(3)Test of the BITE - MEMORY CLEAR function
  (a)In the avionics compartment, on GPCU 7XG :
     - press and release MEMORY CLEAR pushbutton switch.
  (b)The following sequence results :
     EXTERNAL POWER SYSTEM
     LEFT GEN POWER SYSTEM
     RIGHT GEN POWER SYSTEM
     APU GEN POWER SYSTEM
     MEMORY CLEAR HAS BEEN RESET
  (c)On the GPCU
     - press FAULT ISOLATE pushbutton switch
     - the following sequence results :
       LAST FLT LEG
       EXTERNAL POWER SYSTEM OK
       LEFT GEN POWER SYSTEM OK
       RIGHT GEN POWER SYSTEM OK
       APU GEN POWER SYSTEM OK
       FOR PREV FLT PUSH FI SW
     - press again FAULT ISOLATE pushbutton switch
     - the followign sequence results :
       LAST FLT LEG - 1
       EXTERNAL POWER SYSTEM FLIGHT NOT FOUND
       LEFT GEN POWER SYSTEM FLIGHT NOT FOUND
       RIGHT GEN POWER SYSTEM FLIGHT NOT FOUND
       APU GEN POWER SYSTEM FLIGHT NOT FOUND
       FOR PREV FLT PUSH FI SW
(4)Close-up
  (a)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control
R - 24-41-00, P. Block 501	AC External Power Control

2. Procedure (Ref. Fig. 401)

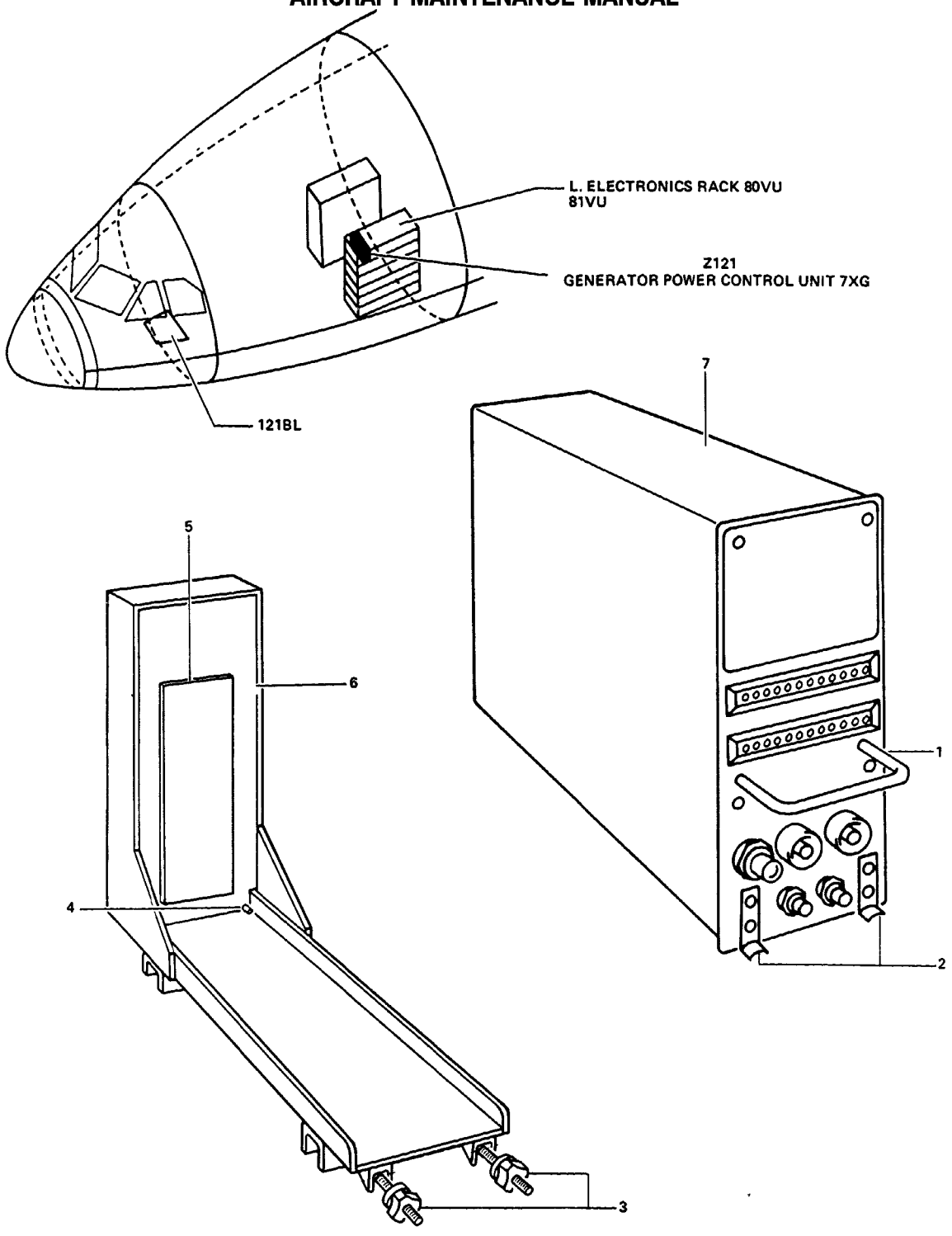
A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that electronics racks ventilation is correct.
(3)On flight compartment overhead panel 424VU check that ELEC PWR/EXT PWR pushbutton switch 10XG is released : AVAIL legend on.
(4)Open access door 121BL.
(5)In avionics compartment, on GPCU 7XG perform a PERIODIC TEST and note system state.
CAUTION : DO NOT PERFORM A "MEMORY CLEAR" ON GPCU 7XG.
(6)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	GND PWR PROTECTION	1XG	A01
133VU	ELEC/EXT PWR/GPCU SUPPLY	17XG	333/T78

B. Removal
(1)Loosen the two locking screws (3).
(2)Lower the two locking screws (3) to free attachment lugs (2).
(3)Using handle (1), pull the generator control unit (7) out until connector (5) and centering pins (4) disengage.
(4)Remove control unit from mount (6).
(5)Install plastic shipping cap on the electrical connector of the unit to protect the connector from damage and contamination.

C. Installation
(1)Remove plastic shipping cap on the electrical connector.
(2)Slide generator power control (7) unit along mount (6).
(3)Push the generator power control unit (7) up to the bottom of the mount (6) to engage connector (5) and centering pins (4).
(4)Engage locking screws (3) with the attachment lugs (2).
(5)Tighten locking screws (3).

R D. Test
(1)Remove safety clips and tags and close circuit breakers 1XG and 17XG.
(2)In flight compartment, on overhead panel 424VU, press ELEC PWR/EXT PWR pushbutton switch 10XG (ON legend comes on).
(3)Perform a MEMORY CLEAR to erase the non volatile memories of the



Ground Power Control Unit
Figure 401

ground power control unit 7XG, and generator control units 1XU, 2XU, 1XS.

R (4)Perform an operational test of the GPCU (Ref. 24-41-00, P. Block 501).

R E. Close-Up

R (1)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (2)Close access door 121BL.

1. Equipment and Materials

ITEM	DESIGNATION	
A.	Warning Notices	
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control	*

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1)Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.

NOTE : This is to avoid 115 volt on contactors which are upstream of EXT PWR line contactor.

(2)Open access door 121BL.

(3)In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4)In flight compartment, on overhead panel 429VU, APU section install a warning notice prohibiting APU start.

(5)In avionics compartment, remove APU GEN door from AC power center 101VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1)Disconnect connector (5).

(2)Remove nuts (3) and remove power connections.

(3)Remove the four screws (1) and washers (2).

(4)Retain contactor (4).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1)Position contactor (4) and secure with the four screws (1) and washers (2).

(2)Secure the different power connections with nuts (3).

R (3)TORQUE nuts (3) to between 0.9 and 1 m.daN (79.65 and 88.49 lbf.in.).

R (4)Connect connector (5).

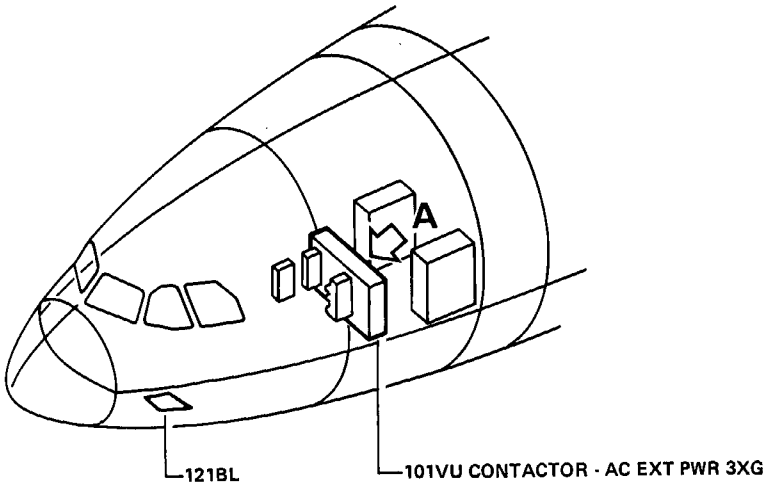
R (5)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

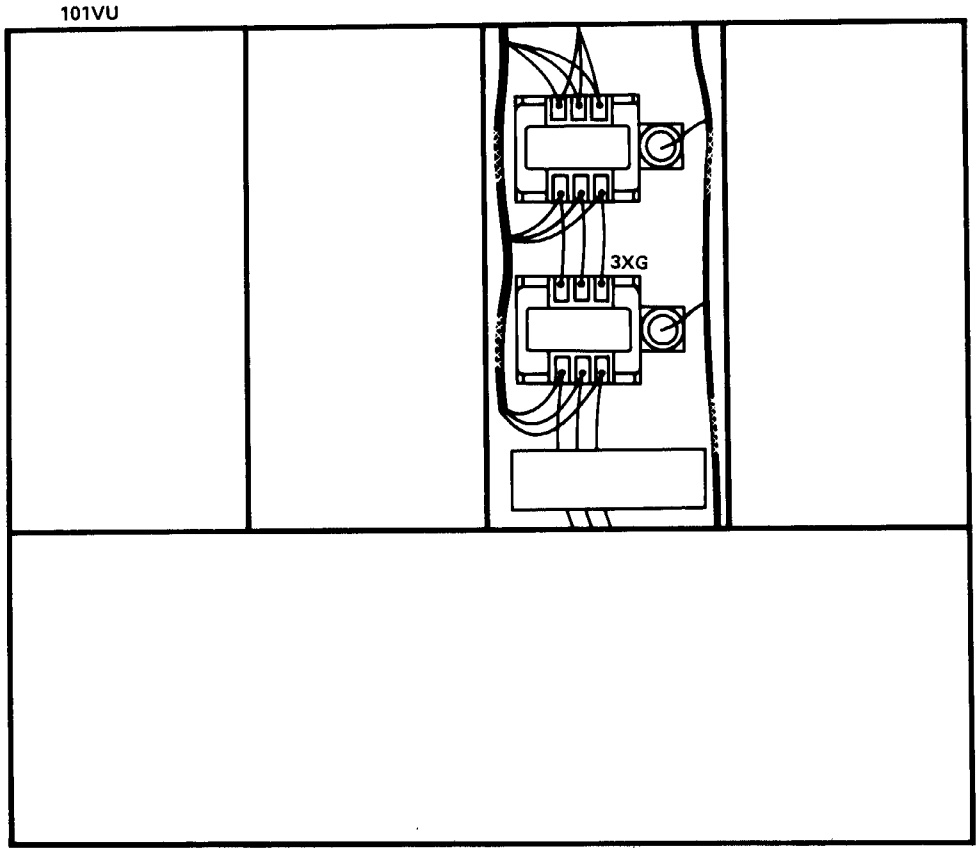
D. Close-Up

(1)Install door(s) on AC power center 101VU.

(2)Close access door 121BL.

(3)In flight compartment, on overhead panels 424VU and 429VU, remove warning





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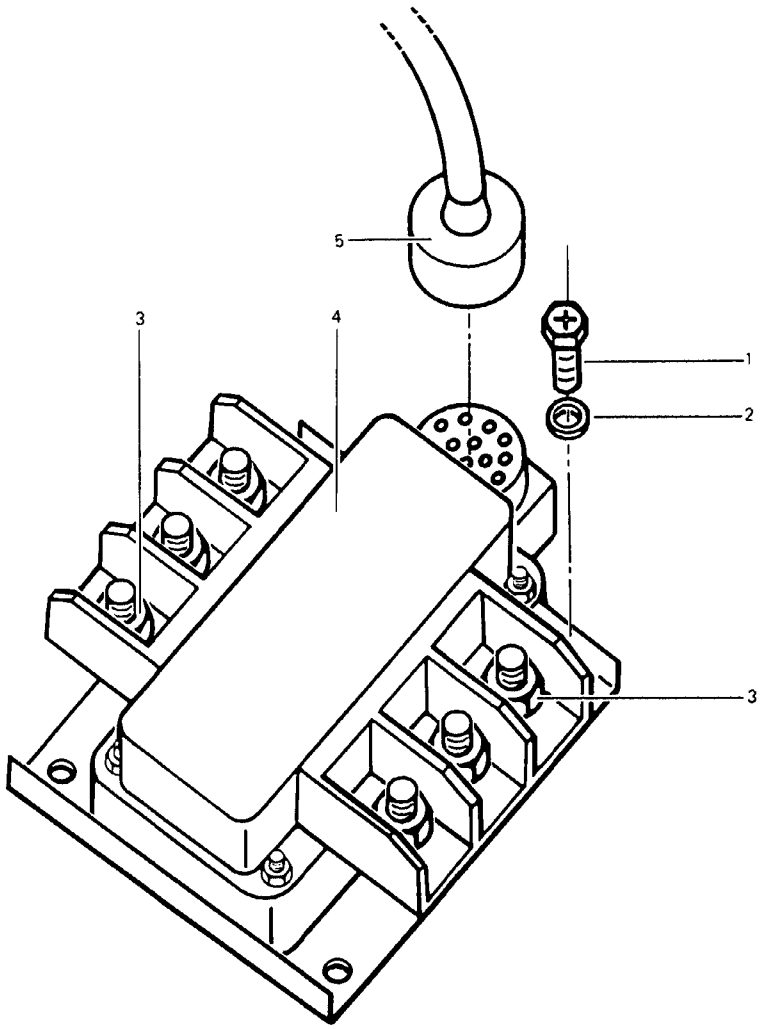
AC EXT PWR Contactor - Location
Figure 401



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AC EXT PWR Contactor
Figure 402

notices.

(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

EXTERNAL POWER RECEPTACLE 656VC - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Torque Wrench - 50 to 100 lbf. in. (0.56 to 1.13 m. daN)
B.	Torque Wrench - 10 to 30 lbf. in. (0.11 to 0.34 m.daN)
C.	Warning Notices
R Referenced Procedure	
R - 24-41-00, P. Block 301	AC External Power Control

2. Procedure (Ref. Fig. 401)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

(1)Make certain that ground electrical power plug is not connected to aircraft receptacle and display a warning notice on door 121EL prohibiting connection to external power receptacle.
(2)Open access door 121BL.
(3)In flight compartment on overhead panel 424VU, display a warning notice prohibiting actuation of EXT PWR pushbutton switch.
(4)Open floor panel 121TF.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON RECEPTACLE, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

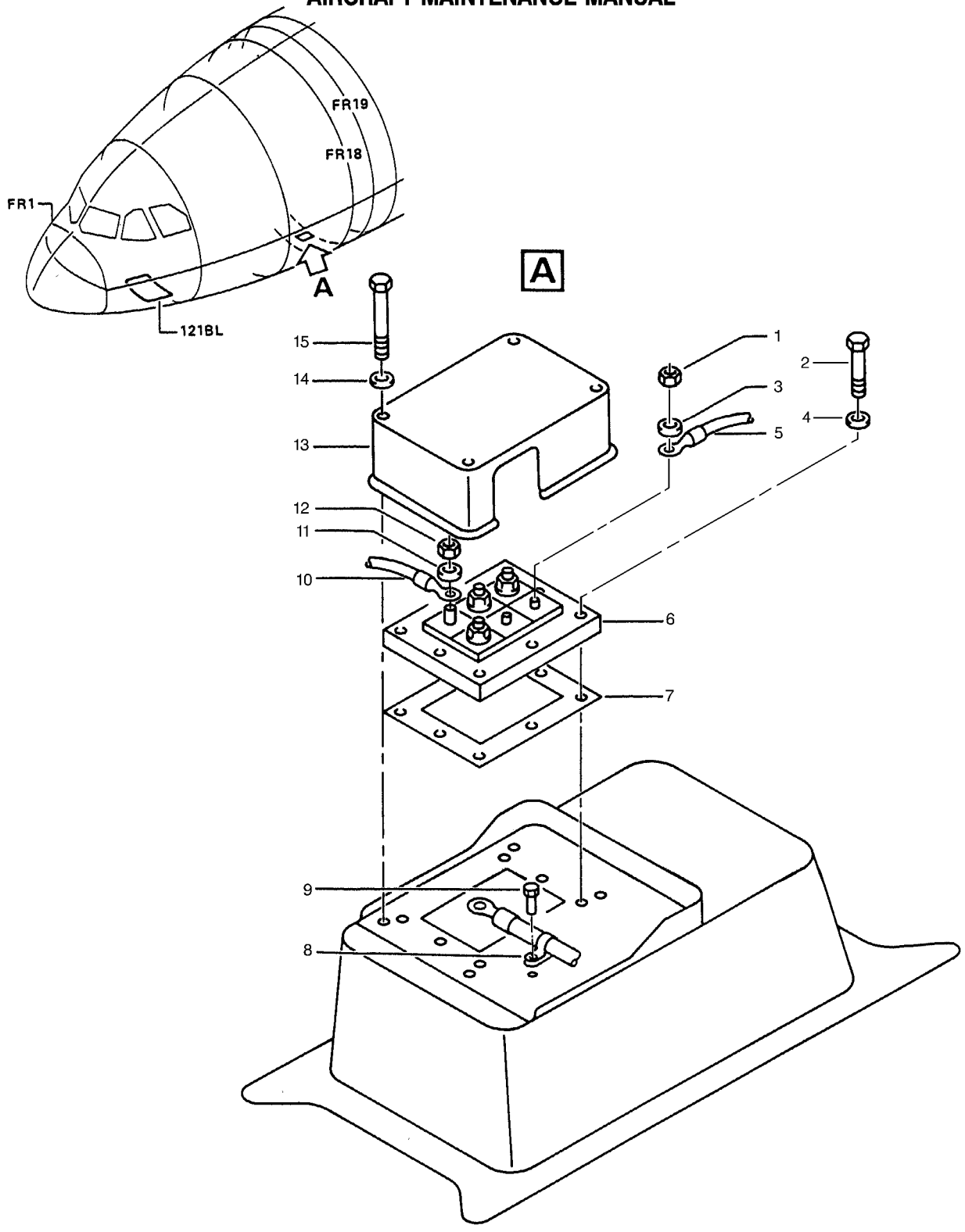
(1)Remove screws (15) and washers (14).
(2)Remove shroud assy (13).
(3)Remove screw (9) attaching clamp (8) of ground wire.
(4)Remove nuts (12) and washers (11) and electrical connections (10).
(5)Remove nuts (1) and washers (3) and electrical connections (5).
(6)Remove screws (2) and washers (4).
(7)Remove receptacle (6) and gasket (7).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1)Install gasket (7) on support and install receptacle (6).
(2)Install the seven screws (2) and washers (4).
(3)Install electrical connections (10) with nuts (12) and washers (11). TORQUE to between 76 and 84 lbf. in. (0.86 and 0.95 m.daN).
(4)Install electrical connections (5) with nuts (1) and washers (3). TORQUE to between 18 and 21 lbf.in. (0.21 and 0.24 m.daN).
(5)Position ground wire in clamp (8), attach clamp (8) with screw (9).
(6)Install shroud assy (13).
(7)Install the four screws (15) and washers (14).

R D. Test



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External Power Receptacle 656VC
Figure 401

R

R (1)Make sure that the aircraft electrical circuits are correctly energized
R with the ground power unit (Ref. 24-41-00, P.Block 301).

R E. Close-Up
(1)Close floor panel 121TF.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panel 424VU, remove warning notice.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

GROUND SERVICE BUS CONTROL

1. General

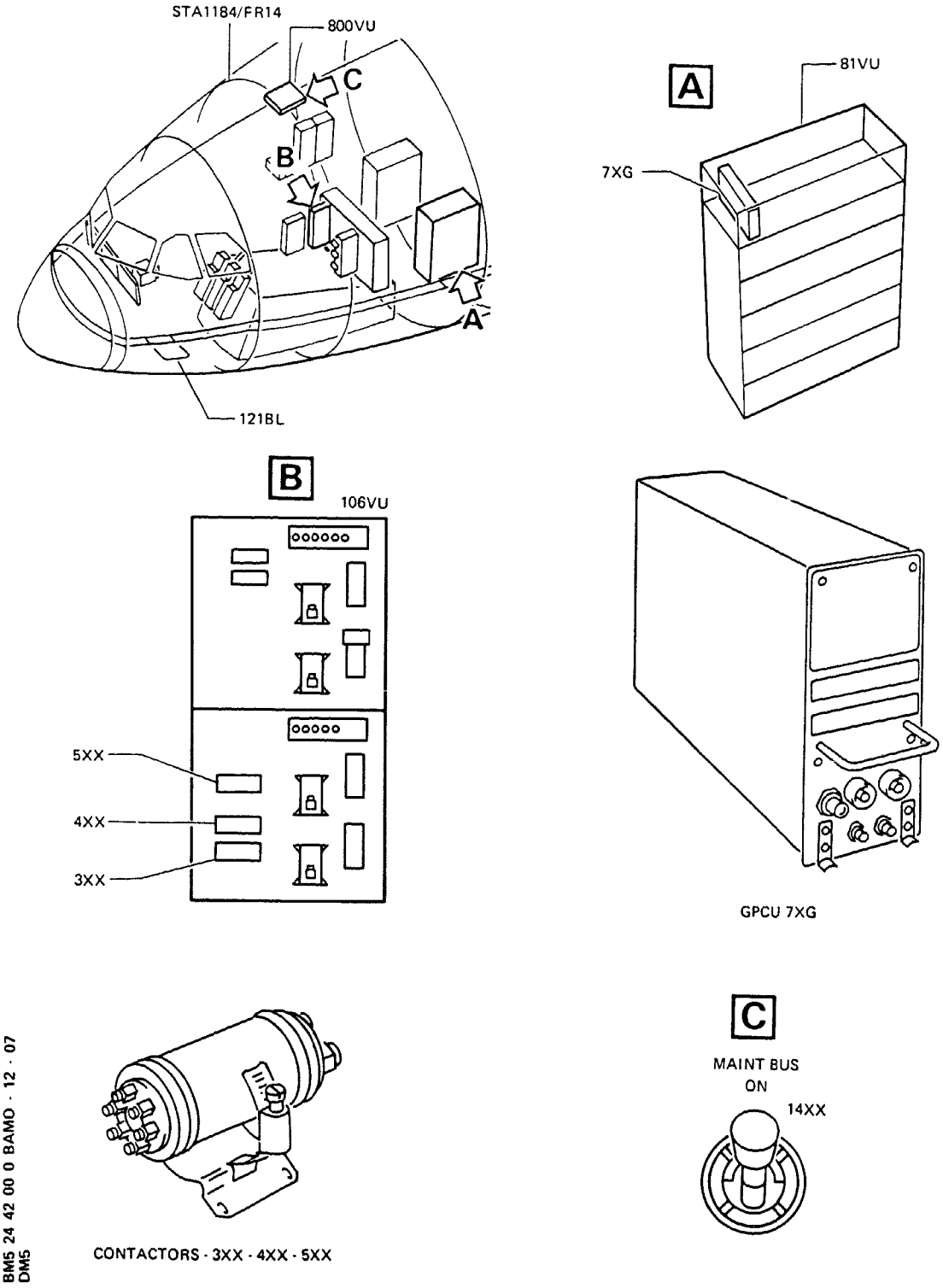
AC and DC ground and ground/flight distribution networks can be supplied :
- either normally from the aircraft network
- or directly by the ground power unit upstream of the external power contactor, (via the TR2 for the DC network) in ground service configuration.

In ground service configuration these networks can be supplied without energizing the whole aircraft.

2. Component Location

(Ref. Fig. 001, 002)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
2PU	TRANSFORMER RECT-2		122	121BL	24-32-11
1XX	CNTOR-AC SERVICE BUS GND/NORMAL SUPPLY	101VU	121	121BL	24-42-11
2XX	CNTOR-AC SERVICE BUS GND/NORMAL SUPPLY	101VU	121	121BL	24-42-11
3XX	CNTOR-DC SERVICE BUS GND SUPPLY	106VU	121	121BL	24-42-00
4XX	CNTOR-DC SERVICE BUS NORMAL SUPPLY	106VU	121	121BL	24-42-00
5XX	CNTOR-DC GROUND BUS	106VU	121	121BL	24-42-00
6XX	CNTOR-TR2 GND/NORMAL SUPPLY	101VU	121	121BL	24-42-13
14XX	SWITCH-MAINT BUS ON	800VU	120		24-42-00
17XX	CNTOR-CARGO LOADING SYS GND/NORM SPLY	101VU	121	121BL	24-42-15
7XG	GPCU	81VU	121	121BL	24-41-11



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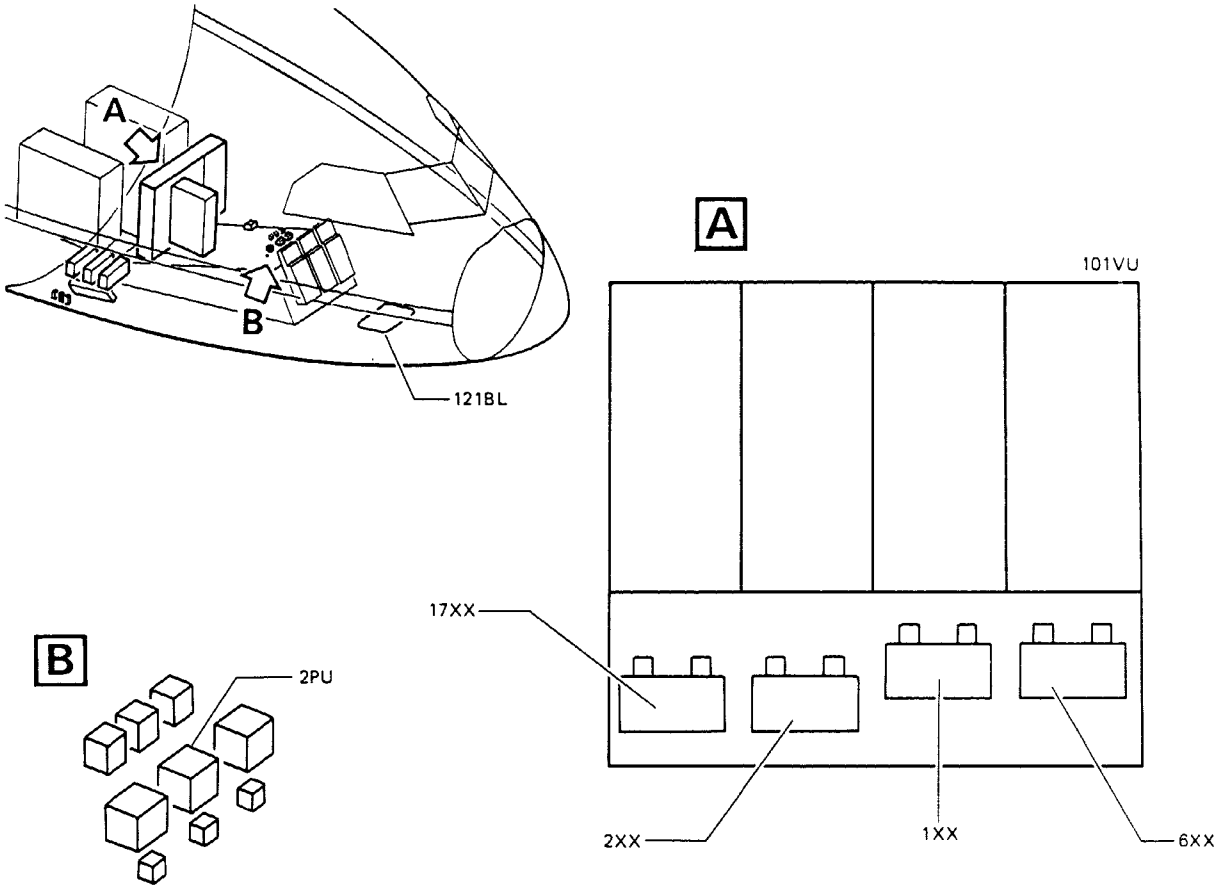
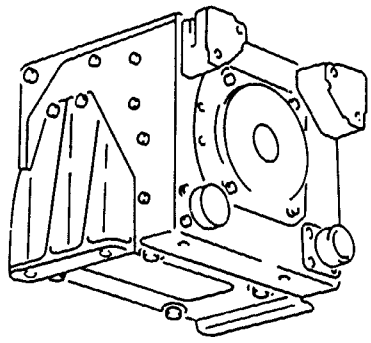
Ground Service Bus Control - Component Location
Figure 001





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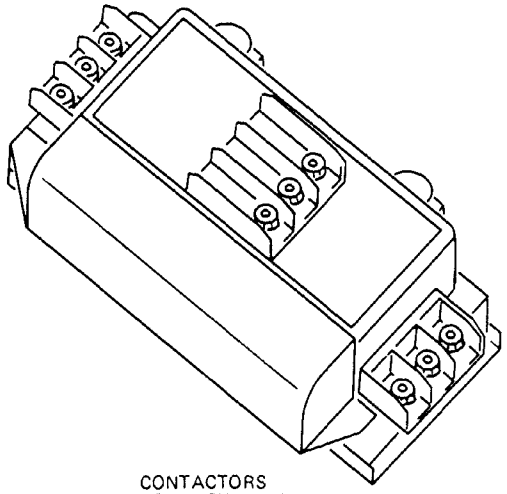

CONTACTORS
1XX - 2XX - 6XX - 17XX

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Ground Service Bus Control - Component Location
Figure 002

R 3. Composition of the networks (Ref. Fig. 003)

More precisely :

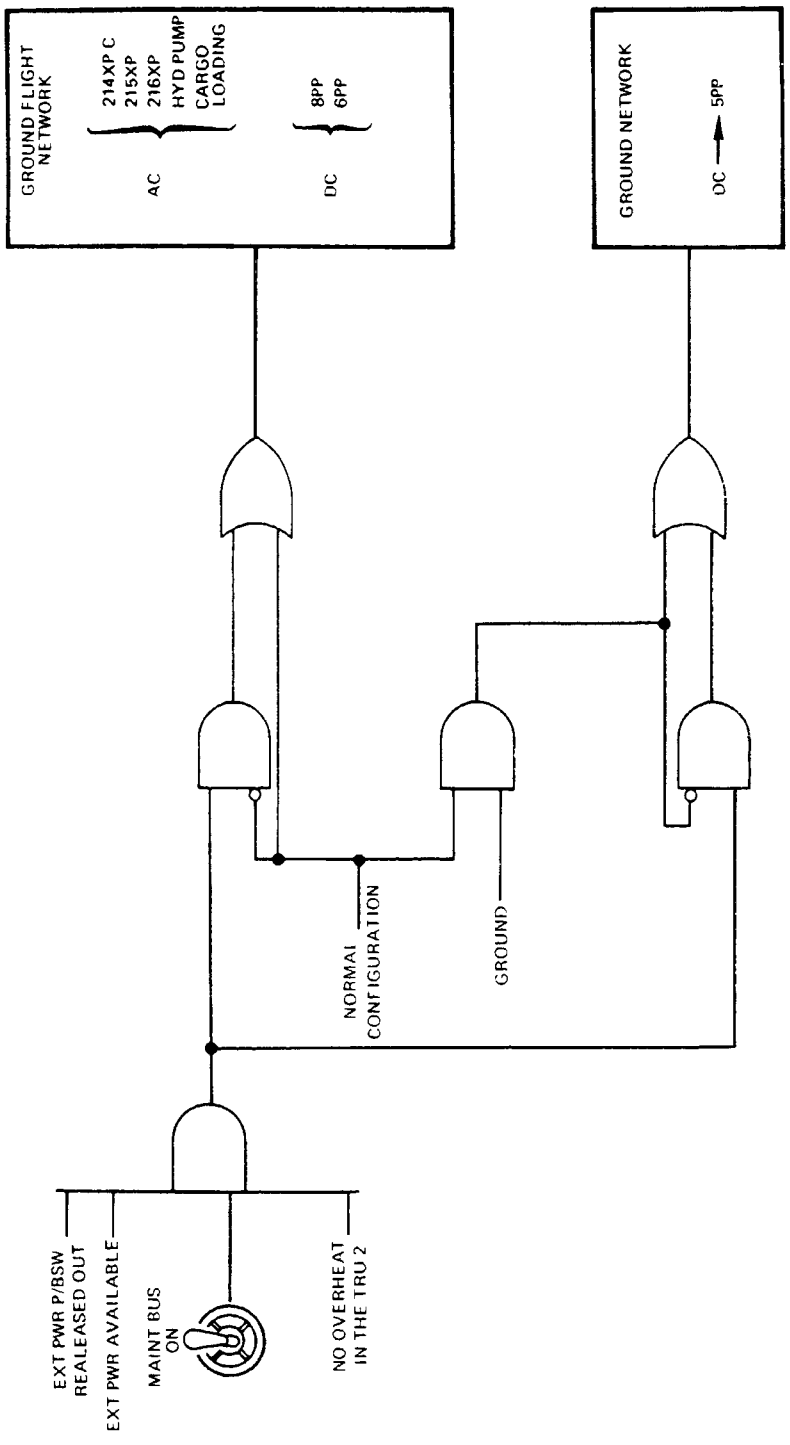
- the AC ground/flight network comprises :
  . sub-busbars 214 XP-C
  215 XP
  216 XP
  217 XP
  . together with the circuits supplying the container loading system.

It may be supplied :

  . either by normal busbar 2XP
  . or by the ground power unit.

- The DC ground/flight network comprises busbar 6PP and the associated sub-busbars and may be supplied :
  . either by normal busbar 1PP
  . or directly by the TR2 (8PP) when it is supplied by the ground power unit.
- The DC ground network comprises busbar 5PP and the associated sub-busbars. It may be supplied on the ground only by busbar 6PP. The network supply is therefore function of busbar 6PP supply conditions.

4. Supply Control (Ref. Fig. 004)



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Ground and Ground/Flight Bus Supply Control - Schematic
Figure 003

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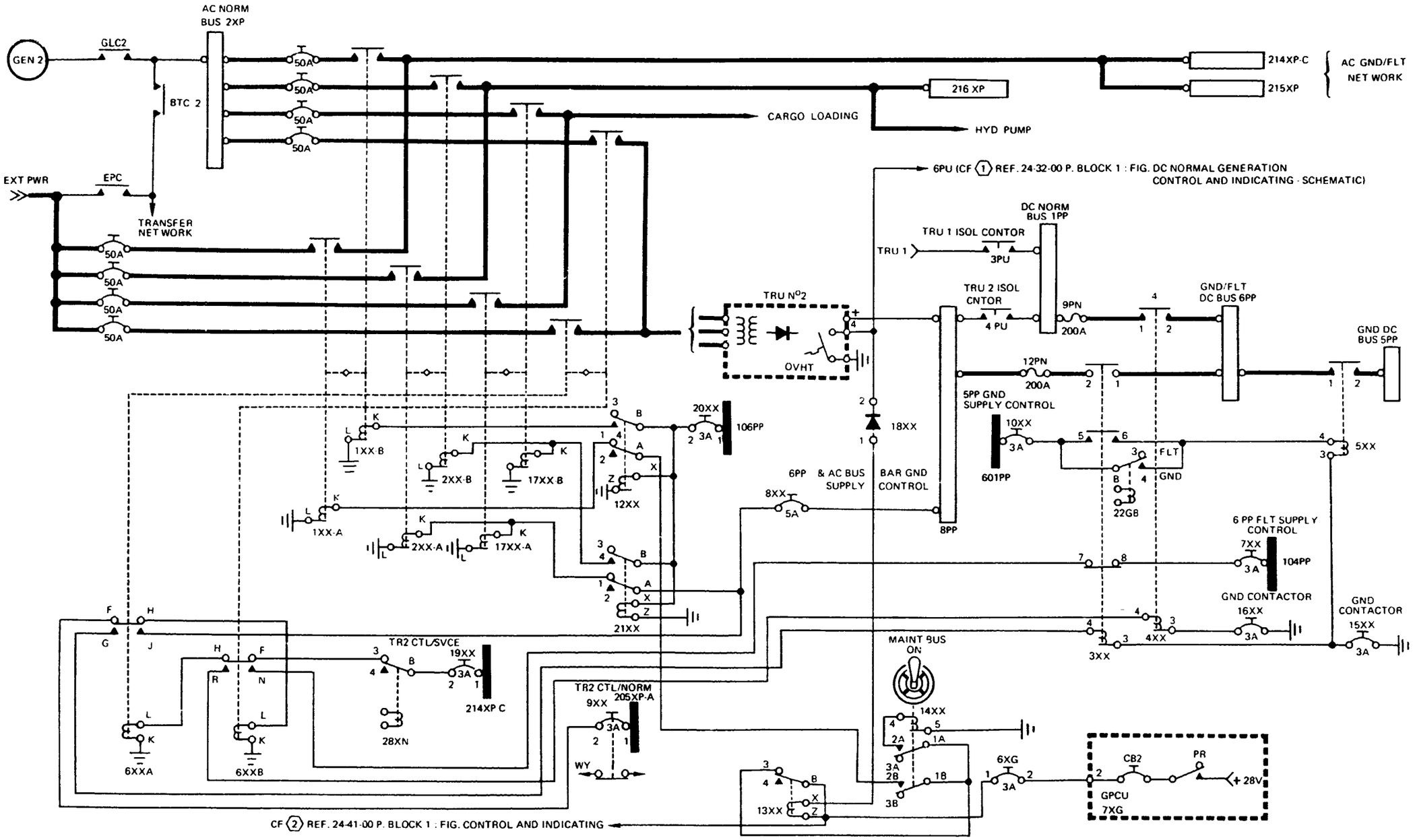

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Ground and Ground/Flight Bus Supply Control
Figure 004

1. Reason for the Job

A. Procedure for Energization of the Ground Service Network by the Ground Power Unit.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Electrical Ground Power Unit - 3-Phase, 115/200V, 400 Hz, 90 KVA
B. 98A24403000000	Cable Holding Strap

3. Procedure

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Job Set-Up
(1)Open door 121EL for access to the external power receptacle and panel 108VU.
(2)Make certain that the supporting strap with the snap hook is in position on the ground power unit feeder.
CAUTION : WHEN THE GROUND POWER UNIT CONNECTOR IS CONNECTED TO THE AIRCRAFT, ALL THE EFFORT OF SUPPORTING THE FEEDER MUST BE BORNE BY THE STRAP LINKED TO THE SUPPORT BY THE SNAP HOOKS SO AS TO PREVENT DAMAGE TO THE AIRCRAFT EXTERNAL POWER RECEPTACLE.
(3)Support the feeder with the strap linked to the support by the snap hook.
(4)Connect the ground power unit connector to the aircraft external power receptacle.

B. Energization of the Ground Service Network
(1)On panel 424VU
- make certain that all pushbutton switches are released (out).
(2)Set ground power unit in operation (follow the instructions specific to the ground power unit).
(3)Correct operation of the protection circuit results in illumination :
(a)On panel 108VU, of EXT PWR/NOT IN USE and EXT PWR/AVAILABLE indicator lights.
(b)On panel 424VU, of AVAIL legend of EXT PWR pushbutton switch.
(4)On Attendants panel 800VU
(a)Place MAINT BUS switch in ON position.
(5)Correct supply of the ground service network is indicated by the extinguishing of EXT PWR/NOT IN USE indicator light on panel 108VU.

C. De-Energization of the Ground Service Network
CAUTION : MAKE CERTAIN THAT THE THREE BAT PUSHBUTTON SWITCHES AND BAT OVRD PUSHBUTTON SWITCH ON PANEL 424VU ARE PRESSED AND
R RELEASED BAT 1,2,3 OFF.
(1)On Attendants panel 800VU

(a)place MAINT BUS switch in OFF position.

(2)Cut off the ground service network supply is indicated by the illumination of EXT PWR/NOT IN USE indicator light on panel 108VU.

D. Close-Up

(1)Follow the instructions specific to the ground power unit to cut off electrical circuit supply.

WARNING : IT IS FORBIDDEN TO DISCONNECT THE GROUND POWER UNIT CONNECTOR WHEN THE CIRCUIT IS ENERGIZED AS THIS COULD CAUSE ARCING WHICH WOULD BE DANGEROUS FOR PERSONNEL, OR DAMAGE TO EQUIPMENT. CUT OFF THE ELECTRICAL SUPPLY BEFORE DISCONNECTING THE GROUND POWER UNIT CONNECTOR.

(2)On panels 108VU and 424VU, all pushbutton switches go off.

(3)Disconnect the ground power unit connector and disengage the snap hook from the support.

(4)Close access door 121EL.

AC SERVICE BUS GND/NORMAL SUPPLY CONTACTOR 1XX (2XX) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices

2. Procedure

(Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected on aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.
NOTE : This is to avoid 115 volt on contactors which are upstream of external power line contactor.

(2) Open access door 121BL.

(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4) In flight compartment on overhead panel 429VU, APU SECTION, install a warning notice prohibiting APU start.

(5) In avionics compartment, remove contactor compartment door from AC power center 101VU.

B. Removal

NOTE : Removal procedure is identical for AC service bus GND/Normal supply contactors (1XX) and (2XX).

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS.

(1) Disconnect connector (1).

(2) Remove nuts (4) and remove power connections.

(3) Remove the four attachment screws (2) and washers (3).

(4) Retain contactor (5).

C. Installation

NOTE : Installation procedure is identical for AC service bus GND/Normal supply contactors (1XX) and (2XX)

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

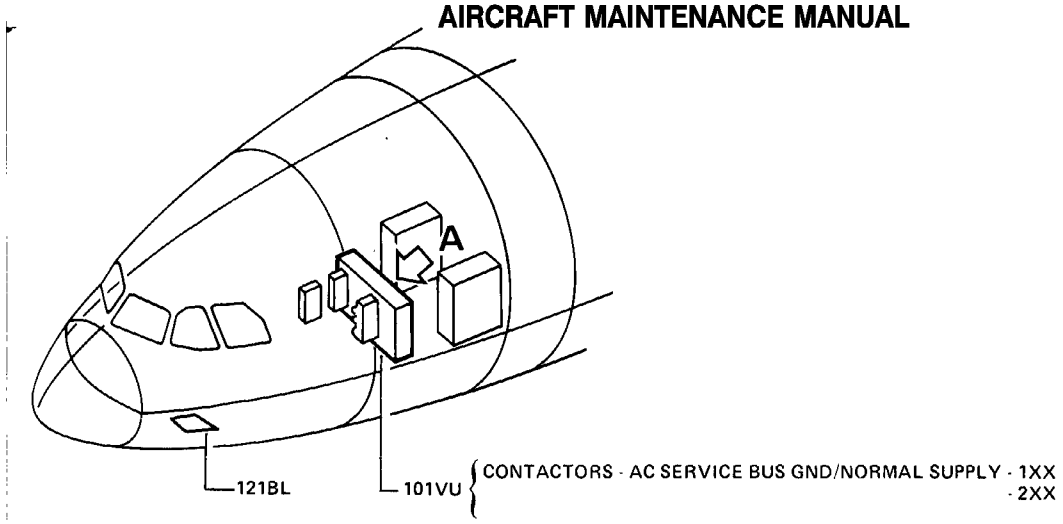
(1) Position contactor (5) and secure with the four screws (2) and washers (3).

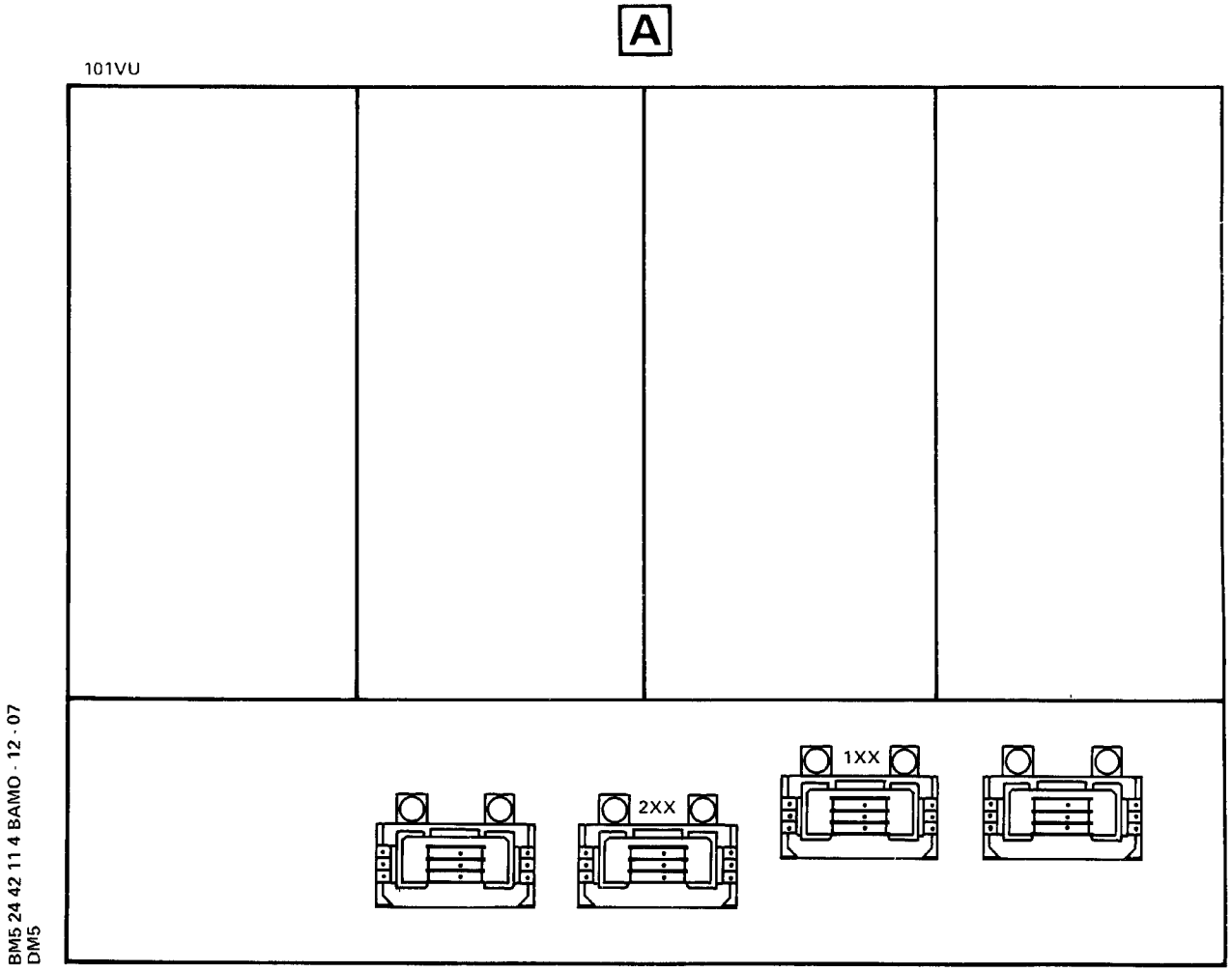
(2) Secure the different power connections with nuts (4).

R (3) TORQUE nuts (4) to between 0.25 and 0.30 m.daN (22.12 and 26.54 lbf.in.).

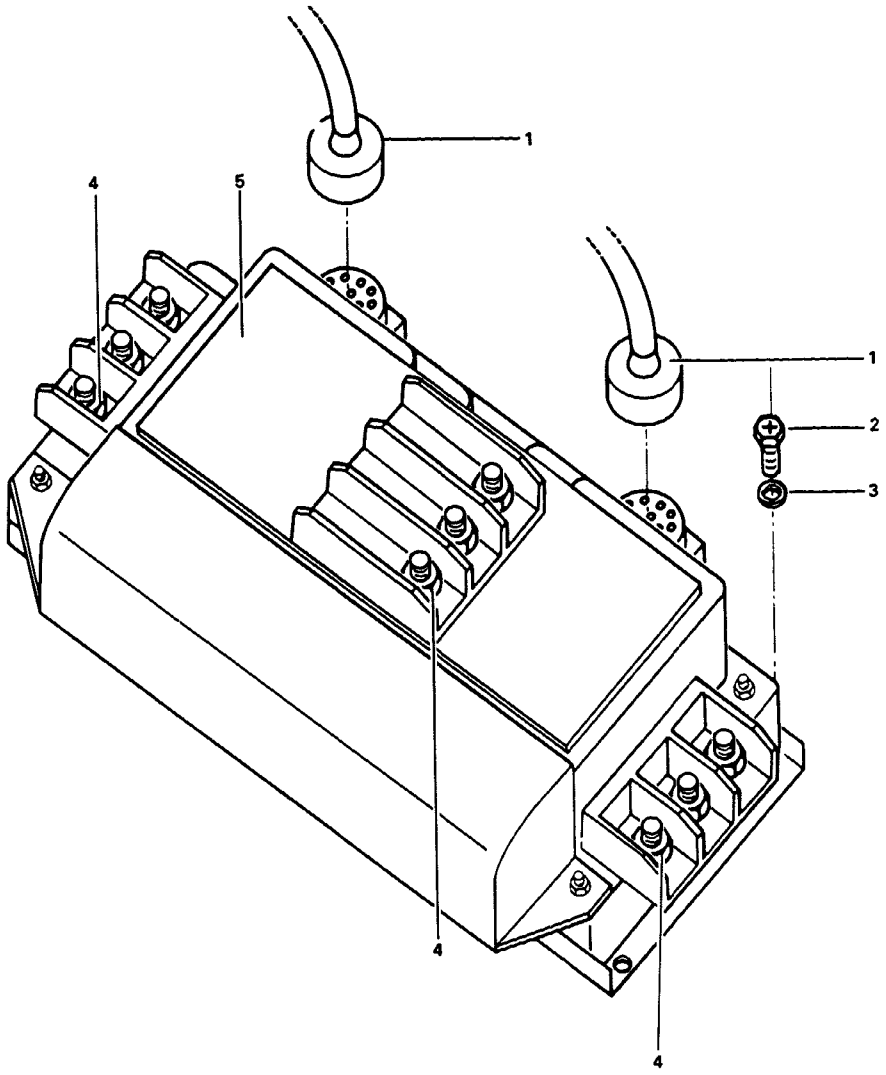
R (4) Connect connector (1).

D. Close-Up





Contactors 1XX (2XX) - Location
Figure 401



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Contactors 1XX (2XX)
Figure 402

(1)Install contactor compartment door on AC power center 101VU.
(2)Close access door 121BL.
(3)In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

TR2 GND/NORMAL SUPPLY CONTACTOR 6XX - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Warning Notices

2. Procedure (Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.
NOTE : This is to avoid 115 volts on contactors which are upstream of external power line contactor.
(2) Open access door 121BL.
(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.
(4) In flight compartment on overhead panel 429VU, APU section, install a warning notice prohibiting APU start.
(5) In avionics compartment, remove contactor compartment door from AC power center 101VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR, CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS.

(1) Disconnect connector (1).
(2) Remove nuts (4) and remove power connections.
(3) Remove the four attachment screws (2) and washers (3).
(4) Retain contactor (5).

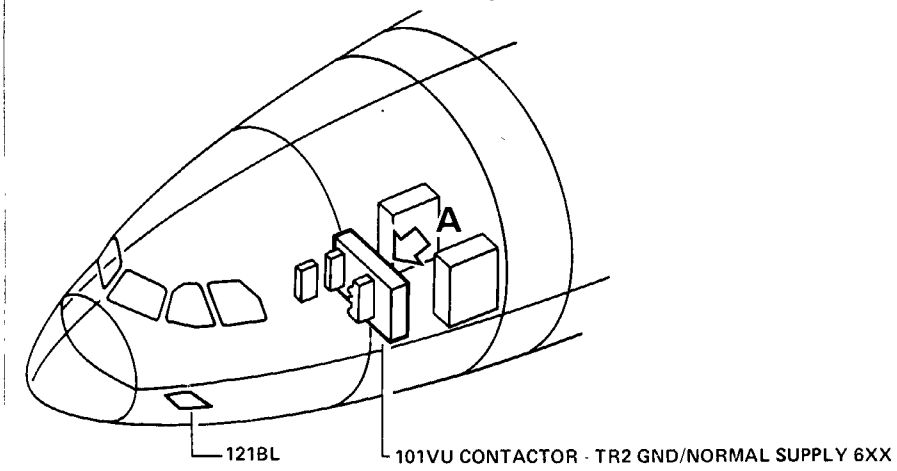
C. Installation

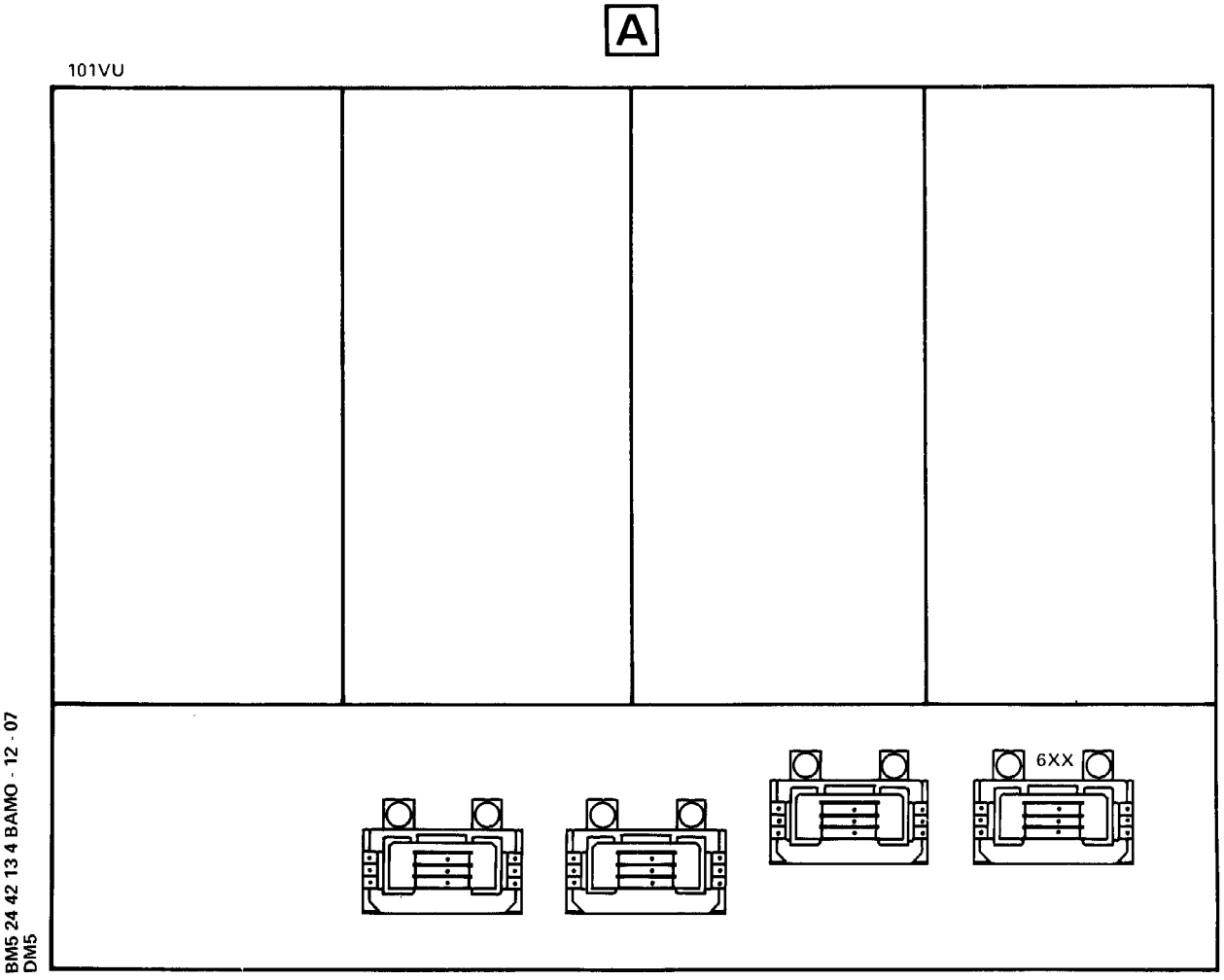
CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1) Position contactor (5) and secure with the four screws (2) and washers (3).
(2) Secure the different power connections with nuts (4).
R (3) TORQUE nuts (4) to between 0.25 and 0.30 m.daN (22.12 and 26.54 lbf.in.).
R (4) Connect connector (1).

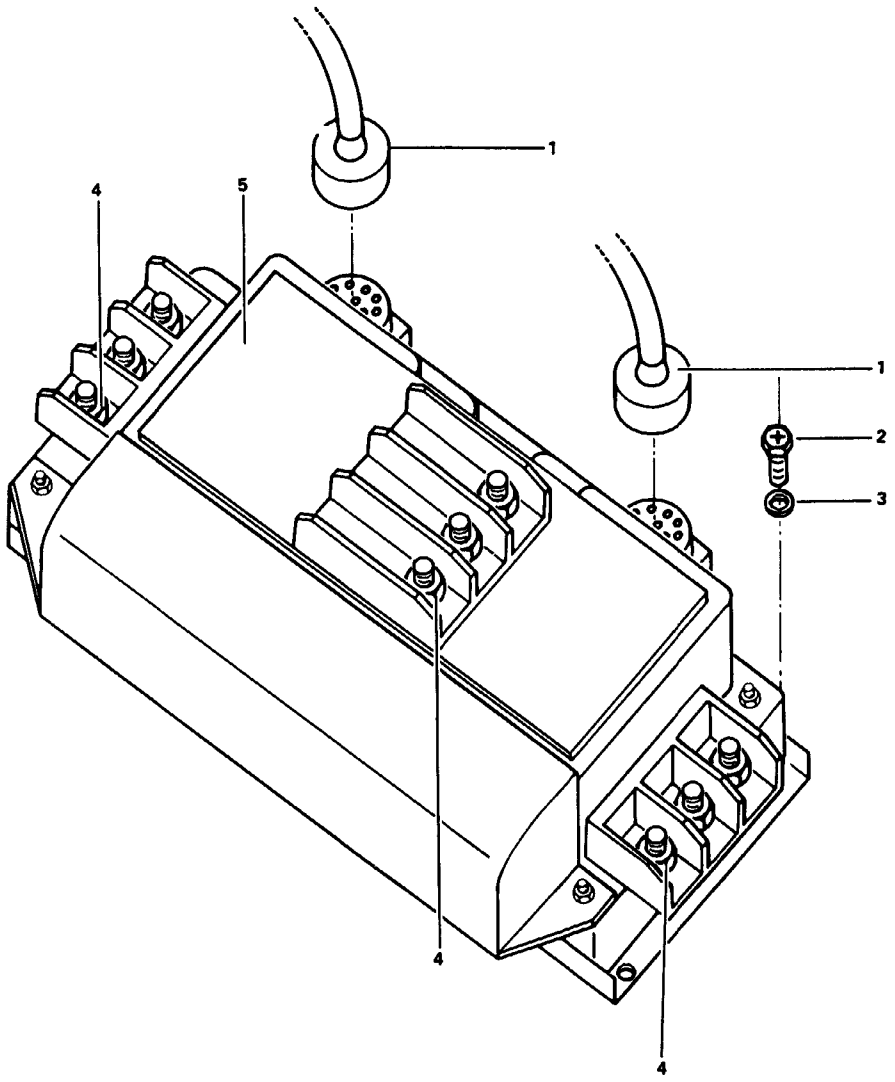
D. Close-Up

(1) Install contactor compartment door on AC power center 101VU.
(2) Close access door 121BL.
(3) In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.
(4) Remove warning notice prohibiting use of external power receptacle from





Contactor 6XX - Location
Figure 401



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Contactor 6XX
Figure 402

door 121EL.

CARGO LOADING SYSTEM GND/NORMAL SUPPLY CONTACTOR 17XX - REMOVAL/INSTALLATION

1. Equipement and Materials

ITEM	DESIGNATION
A.	Warning Notices

2. Procedure

(Ref. Fig. 401, 402)

A. Job Set-Up

WARNING : THERE IS DANGER TO LIFE WHEN WORKING ON A LIVE 200/115 VOLT ELECTRICAL CIRCUIT.

CAUTION : DO NOT SUPPLY THE AIRCRAFT ELECTRICAL NETWORK BY EXTERNAL POWER AND APU GEN.

(1) Make certain that ground electrical power plug is not connected to aircraft receptacle and install a warning notice on door 121EL prohibiting connection of external power receptacle.
NOTE : This is to avoid 115 volt on contactors which are upstream of external power line contactor.

(2) Open access door 121BL.

(3) In flight compartment, on overhead panel 424VU, release APU GEN pushbutton switch and install a warning notice prohibiting actuation of BAT 1, 2, 3, APU GEN and BAT OVRD pushbutton switches.

(4) In flight compartment on overhead panel 429VU, APU section, install a warning notice prohibiting APU start.

(5) In avionics compartment, remove contactor compartment door from AC power center 101VU.

B. Removal

CAUTION : PRIOR TO ANY OPERATION ON CONTACTOR CAREFULLY MATCHMARK ALL ELECTRICAL CONNECTIONS FOR RELOCATION PURPOSES.

(1) Disconnect connector (1).

(2) Remove nuts (4) and remove power connections.

(3) Remove the four screws (2) and washsers (3).

(4) Retain contactor (5).

C. Installation

CAUTION : SECURE ELECTRICAL CONNECTIONS IN POSITIONS NOTED DURING REMOVAL.

(1) Position contactor (5) and secure with the four screws (2) and washers (3).

(2) Secure the different power connections with nuts (4).

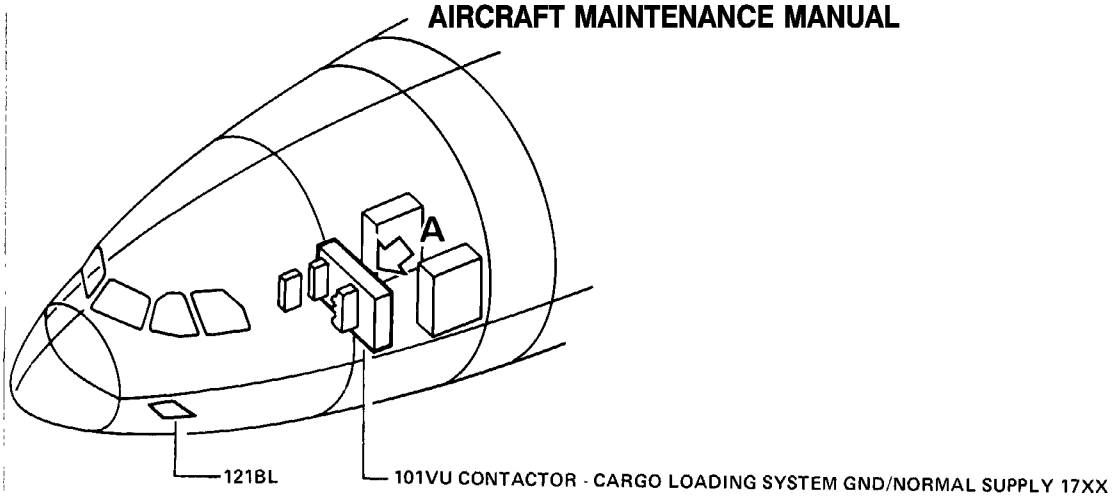
R (3) TORQUE nuts (4) to between 0.25 and 0.30 m.daN (22.12 and 26.54 lbf.in.).

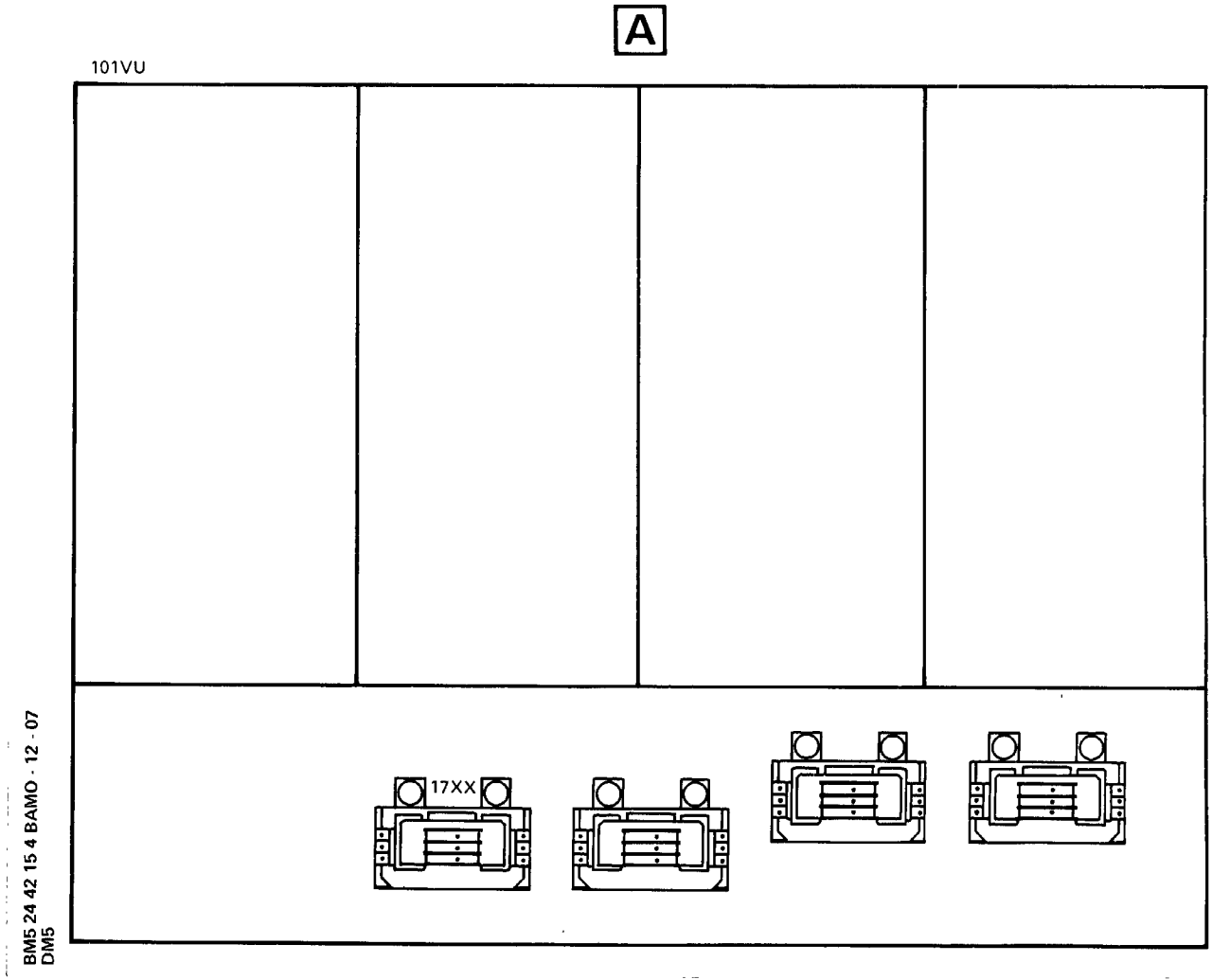
R (4) Connect connector (1).

D. Close-Up

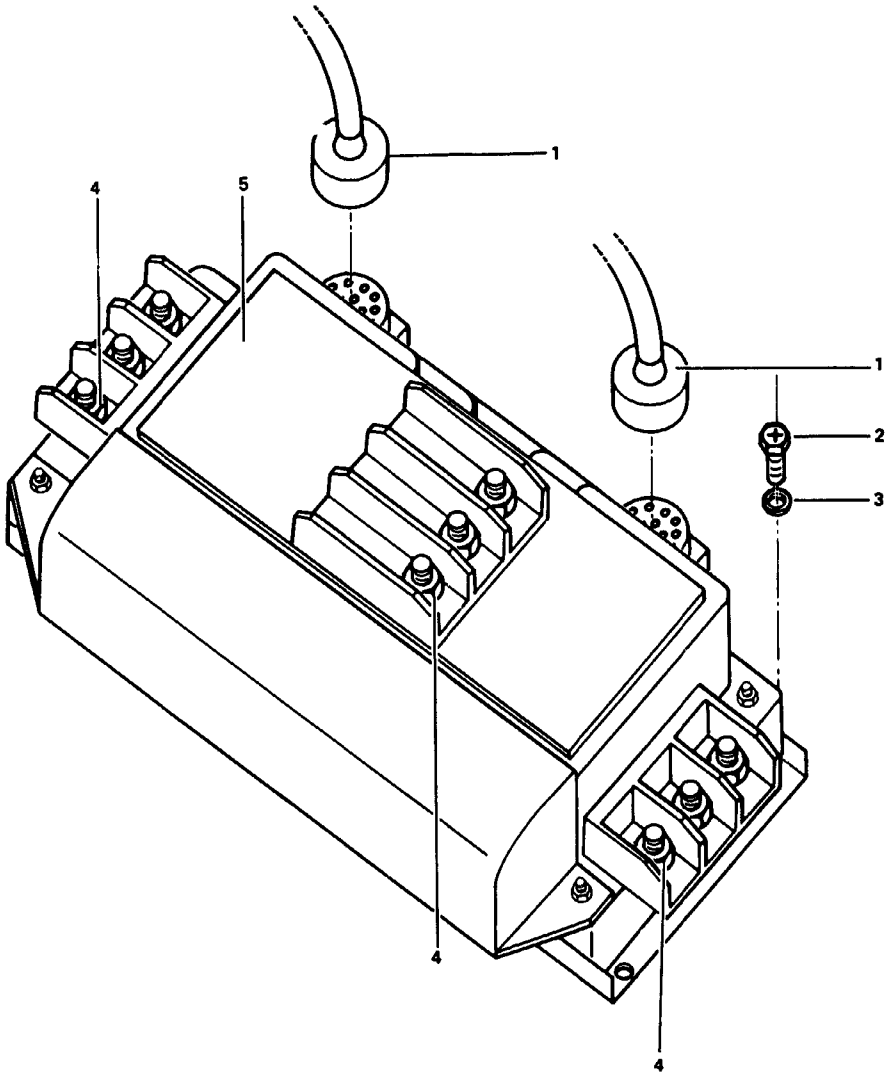
(1) Install contactor compartment door on AC power center 101VU.

(2) Close access door 121BL.





Cargo Loading System GND/Normal Supply Contactor 17XX - Location
Figure 401



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Cargo Loading System GND/Normal Supply Contactor 17XX
Figure 402

(3)In flight compartment, on overhead panels 424VU and 429VU, remove warning notices.
(4)Remove warning notice prohibiting use of external power receptacle from door 121EL.

ELECTRICAL LOAD DISTRIBUTION

1. General

The electrical power distribution on board is carried out in several steps corresponding to :

- on one hand, a power distribution
  - . from the different sources or power transformers towards the main busbars located in the electrical power centers
  - . then, from the main busbars, either directly towards important consumers (pumps,..., APU starter,...), or towards the associated distribution sub-bars located in the circuit breaker panels
- on the other hand, the distribution from these sub-busbars towards the different consumers.

In this chapter, power distribution only is dealt with. The distribution towards the various consumers depends on a list of circuit breakers per busbars and sub-busbars and are the subject of the appendix.

Sheet 1 gives a schematic summary of the whole AC and DC distribution on board.

R **ON A/C 001-003,

(Ref. Fig. 001)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 002)

R **ON A/C 101-200,

R (Ref. Fig. 003)

R **ON A/C 006-100,

(Ref. Fig. 004)

**ON A/C ALL

This can be broken down as follows :

- the normal AC distribution connected to busbars 1XP and 2XP (Ref. 24-51-00, P. Block 1)
- the essential AC distribution connected to busbar 3XP (Ref. 24-52-00, P. Block 1)
- the emergency AC distribution connected to busbar 4XP (Ref. 24-53-00, P. Block 1)
- the normal DC distribution connected to busbars 1PP, 5PP and 6PP (Ref. 24-54-00, P. Block 1)
- the essential DC distribution connected to busbar 3PP (Ref. 24-55-00, P. Block 1)

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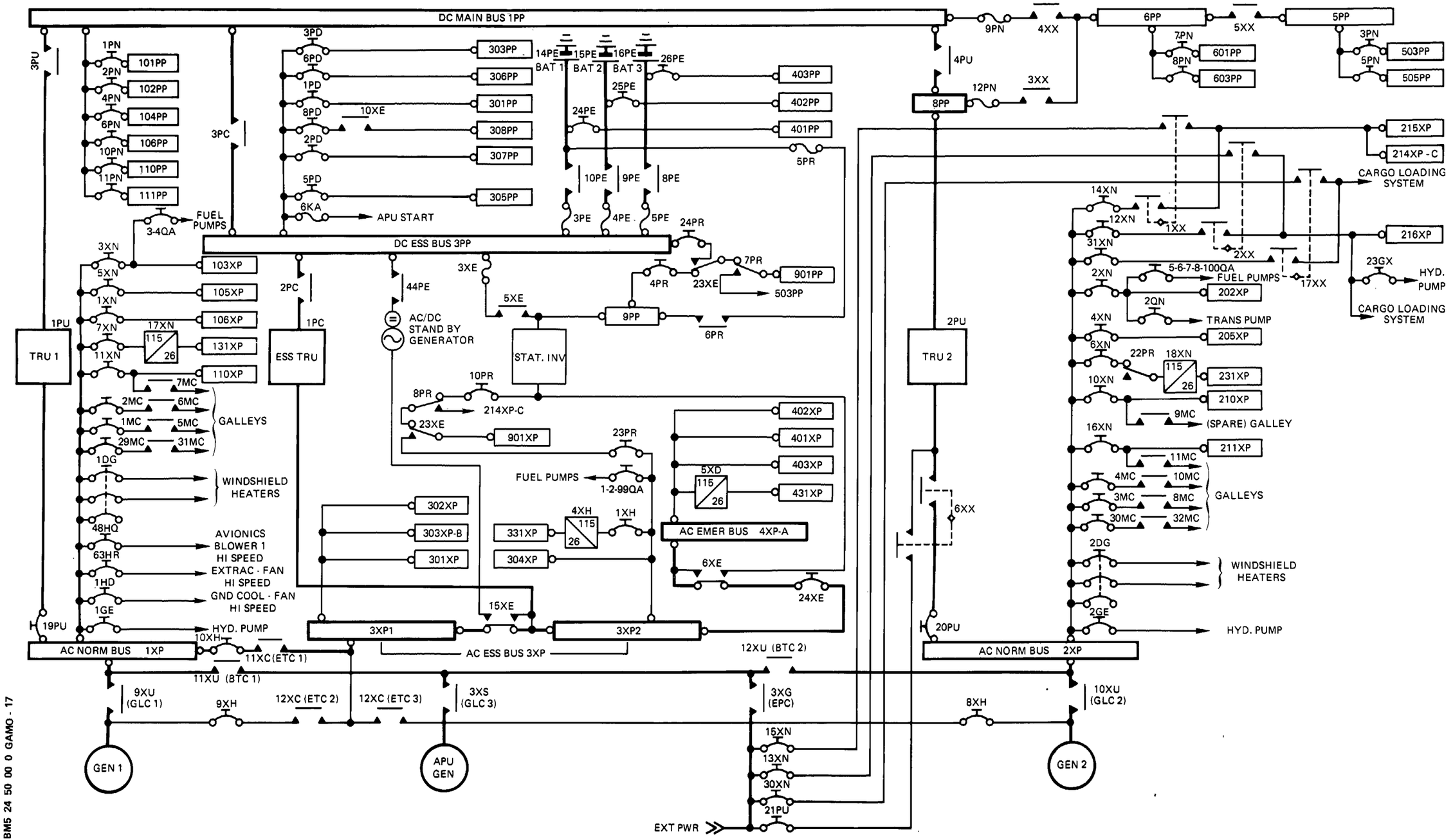

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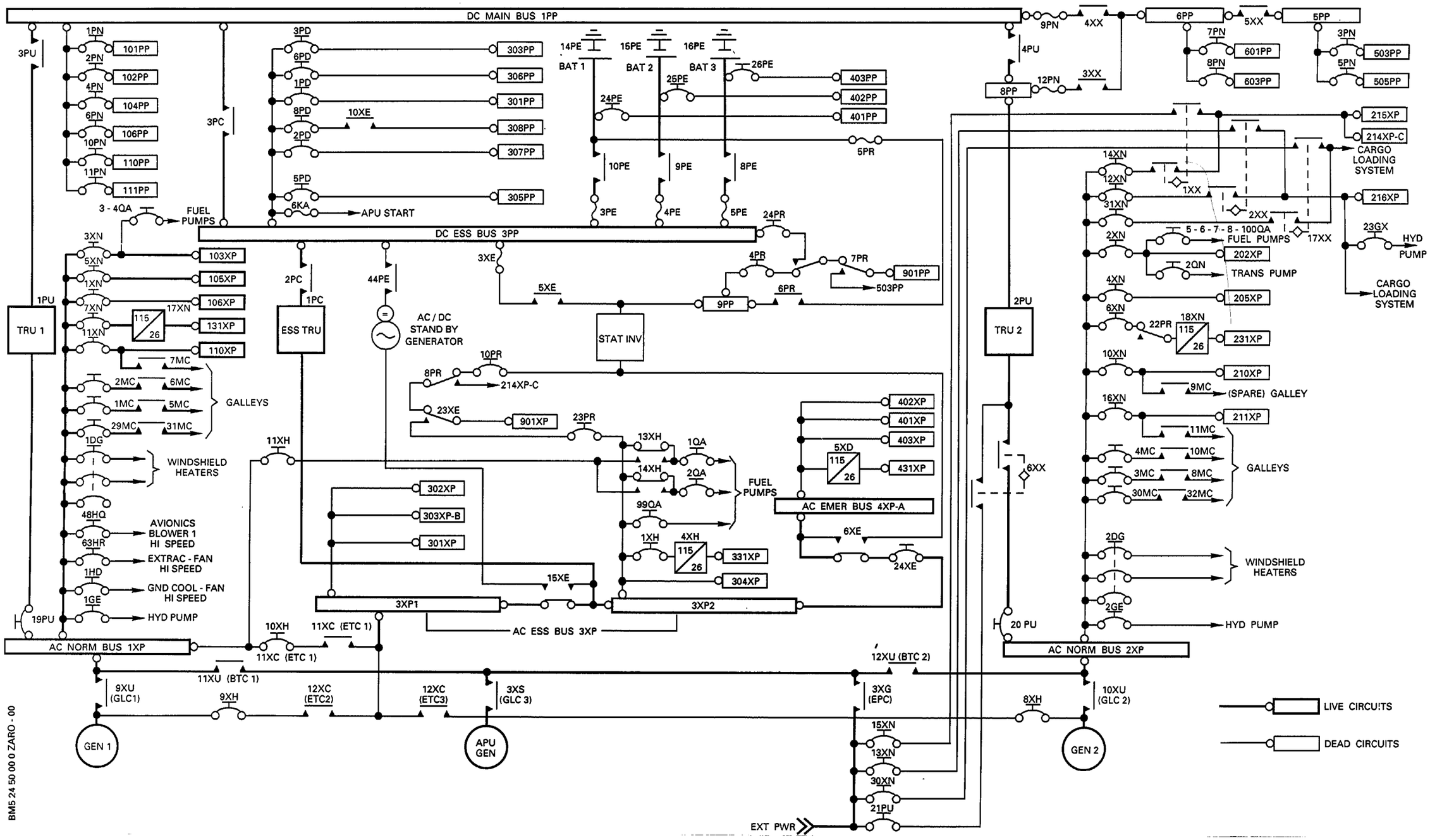
Electrical Load Distribution - General
Figure 001



Electrical Load Distribution - General
Figure 002

R EFFECTIVITY: 001-005,

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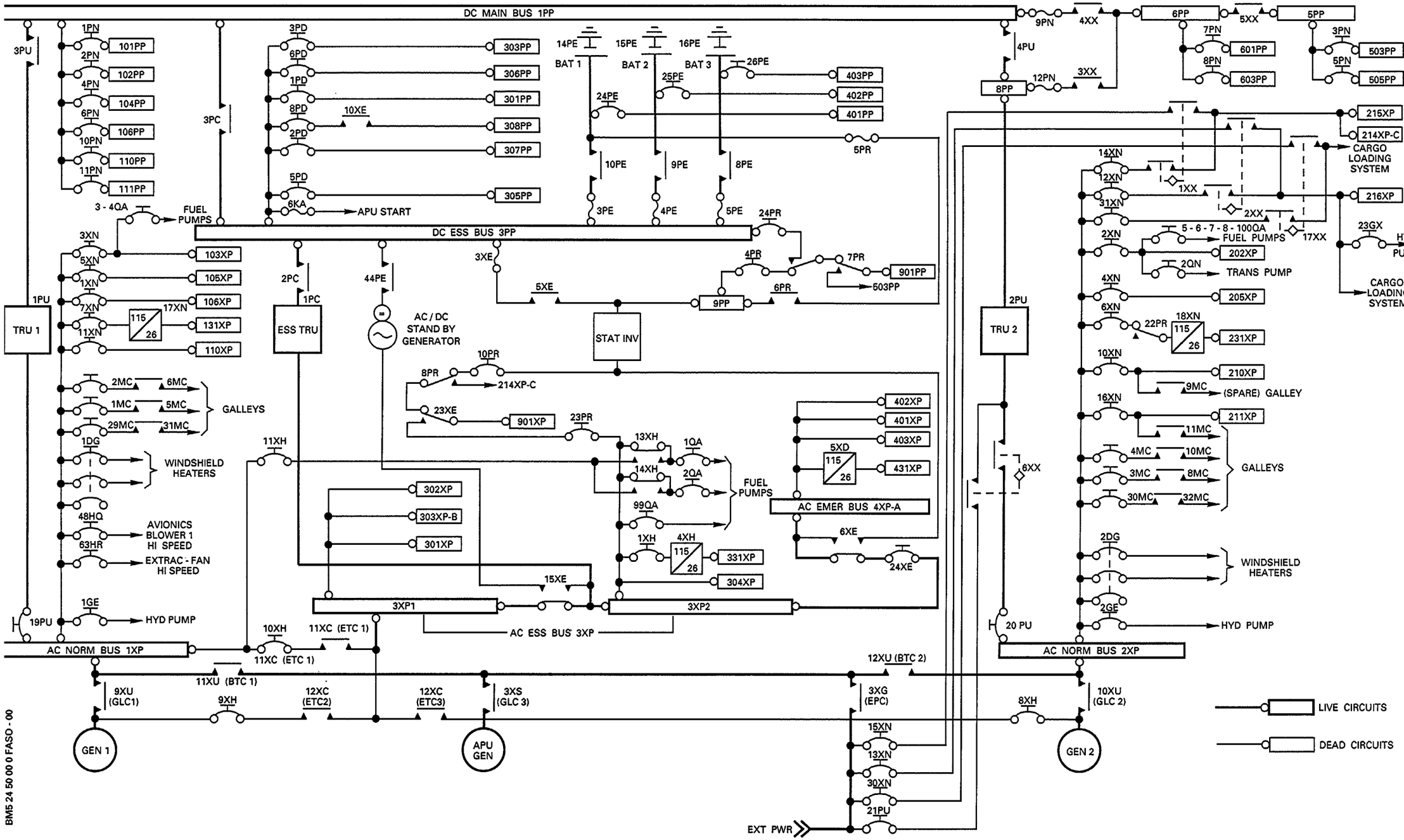

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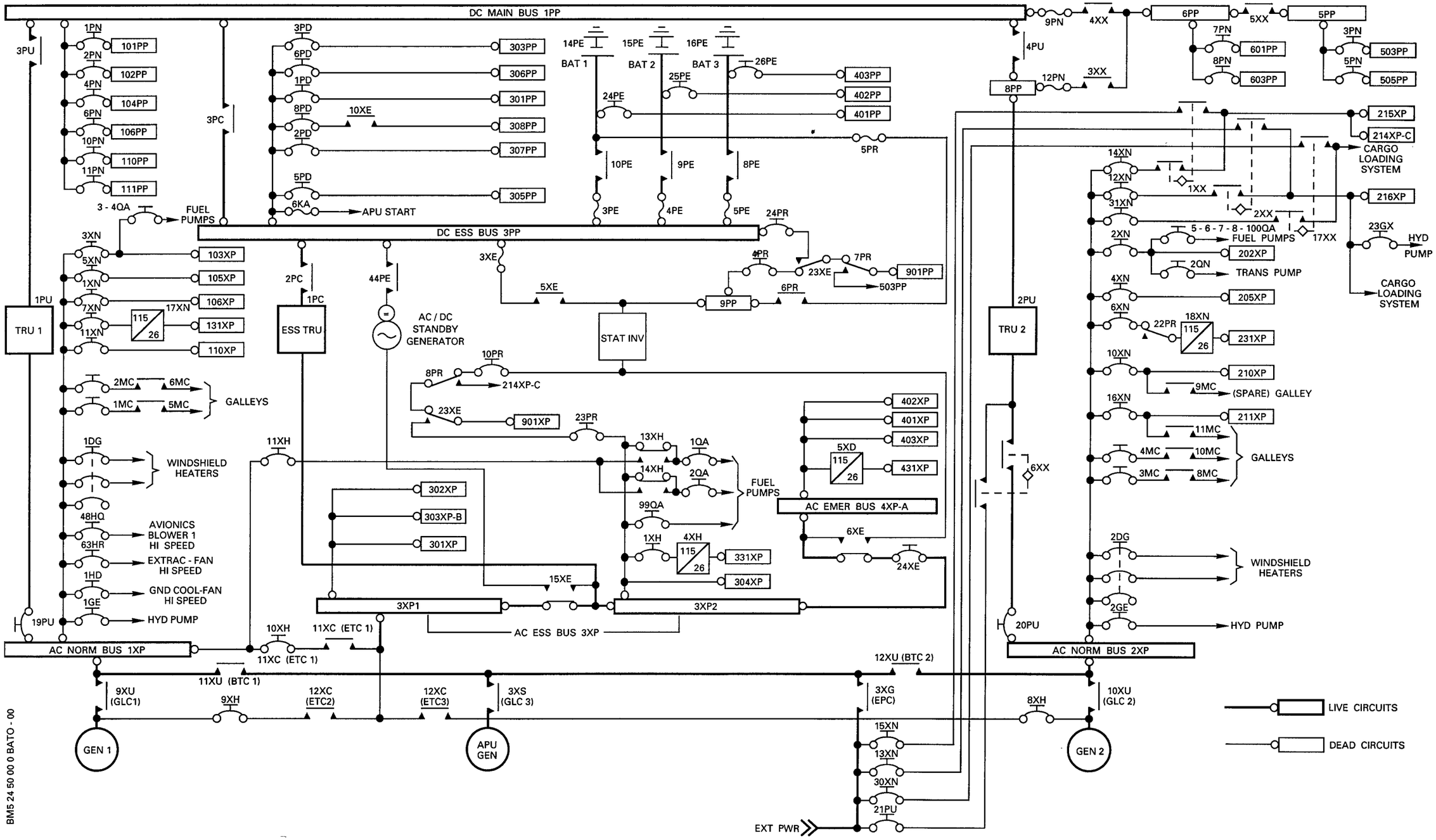
Electrical Load Distribution - General
Figure 003

R



Electrical Load Distribution - General
Figure 004

Distribution busbar supply depends on :
- the various power sources availability
- the procedures applied by the crew members in the different failure configurations, and this can be broken down as follows :
  - a normal flight configuration
  - an emergency configuration corresponding to the loss of the two main generators with the auxiliary generator not available
  - a smoke emergency configuration
  - finally, particular configurations relative to :
    . the ground service network supply only, from the ground connection
    . the supply of the busbars necessary for refuelling/defuelling

2. Distribution Busbar Numbering Principle

A. Main Busbars
They are identified by a three digit alphanumerical identifier :

```
---------------
|    . . P    |
---------------
```

- the first digit (1, 2, ...9) indicates the busbar number.
- the second digit (X, P) indicates the corresponding power form (alternating current or continuous current respectively).

exemple : 1XP main alternating current busbars
3XP
3PP main continuous current busbars
9PP

B. Auxiliary Busbars or Sub-Busbars
They are identified in the same way, but with three identification numbers

```
---------------
|  . . . . P  |
---------------

              Sub-busbar number
```

- the hundreds is identical to the number of the corresponding main busbar
- the two following numbers give the sub-busbar number

It should be noted that for the AC network, the thirties is used for the 26V-400Hz distribution
Example
401XP
402XP
431XP
are sub-busbars of the main busbar 4XP and 431XP the 26V-400Hz distribution sub-busbar,
603PP
is a sub-busbar of 6PP.
NOTE : Moreover, the designation of some AC monophase sub-busbars may mention the supply phase identification (ex : 214XP-C)

3. Organization and Implementation of Power Distribution

A. AC Distribution

Sheet 2 gives a schematic summary of the organization and implementation of the AC power center 101VU. It is divided into five compartments : generator 1, generator 2, essential, APU generator/ground power unit and a compartment containing different power contactors which is located below the four main ones.

**ON A/C 006-100,

(Ref. Fig. 005)

**ON A/C 001-005,

(Ref. Fig. 006)

R **ON A/C 101-200,

R (Ref. Fig. 007)

**ON A/C ALL

(1)Generator 1 compartment mainly comprises line and transfer contactors of channel 1 as well as normal busbar 1XP.
It receives power either from the generator feeder or by the transfer circuit.
The power is distributed via high rated primary circuit breakers (10, 25, 35, 50A) and differential protection current transformers towards important consumers or the associated busbars.

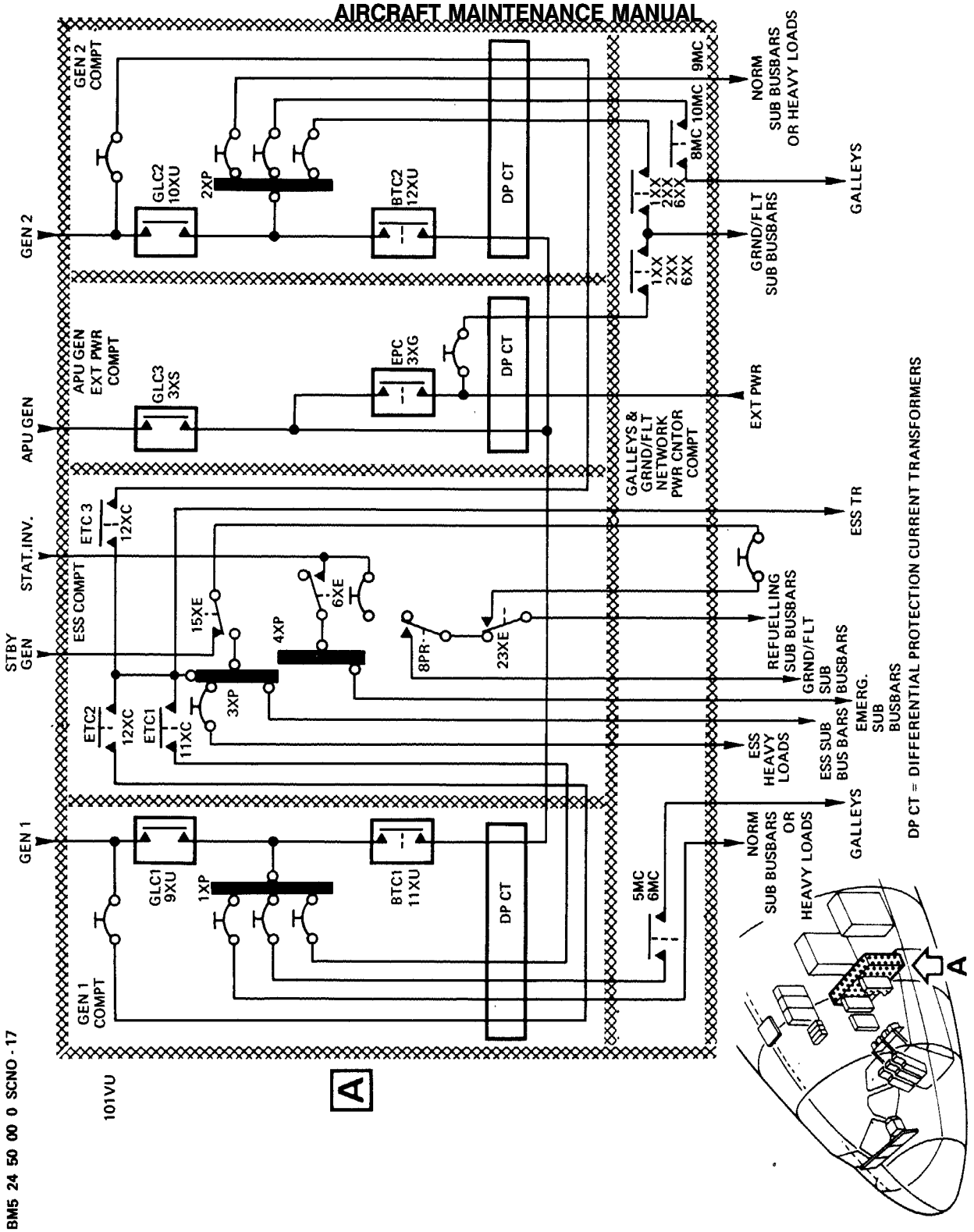
(2)The compartment generator 2 is organized and implemented similarly.

(3)The essential compartment mainly contains the essential busbar 3XP and emergency busbar 4XP and their supply selection contactors.
It also contains the refuelling sub-busbar supply selection contactor.

(a)The essential busbar is supplied from generator 1 or generator 2 compartment.
The power is distributed
- either towards important consumers via a specific circuit breaker
- or towards an associated sub-busbars

(b)The emergency busbar is supplied from the essential busbar or the static inverter feeder or the standby generator via busbar 3XP2.
Power is distributed towards the associated sub-busbars.

(4)The APU generator/ground power unit compartment mainly contains the corresponding line and ground contactors.
The power received by the generator or ground power unit feeders is distributed towards generator 1 and 2 compartments via the transfer circuit and through differential protection current transformers.
It should be noted that the power received by the ground power unit feeder can be distributed, independently from the main network, through high rated primary circuit breakers and the same current transformers towards the ground/flight network.



Electrical Load Distribution AC Power Center Organization
Figure 005

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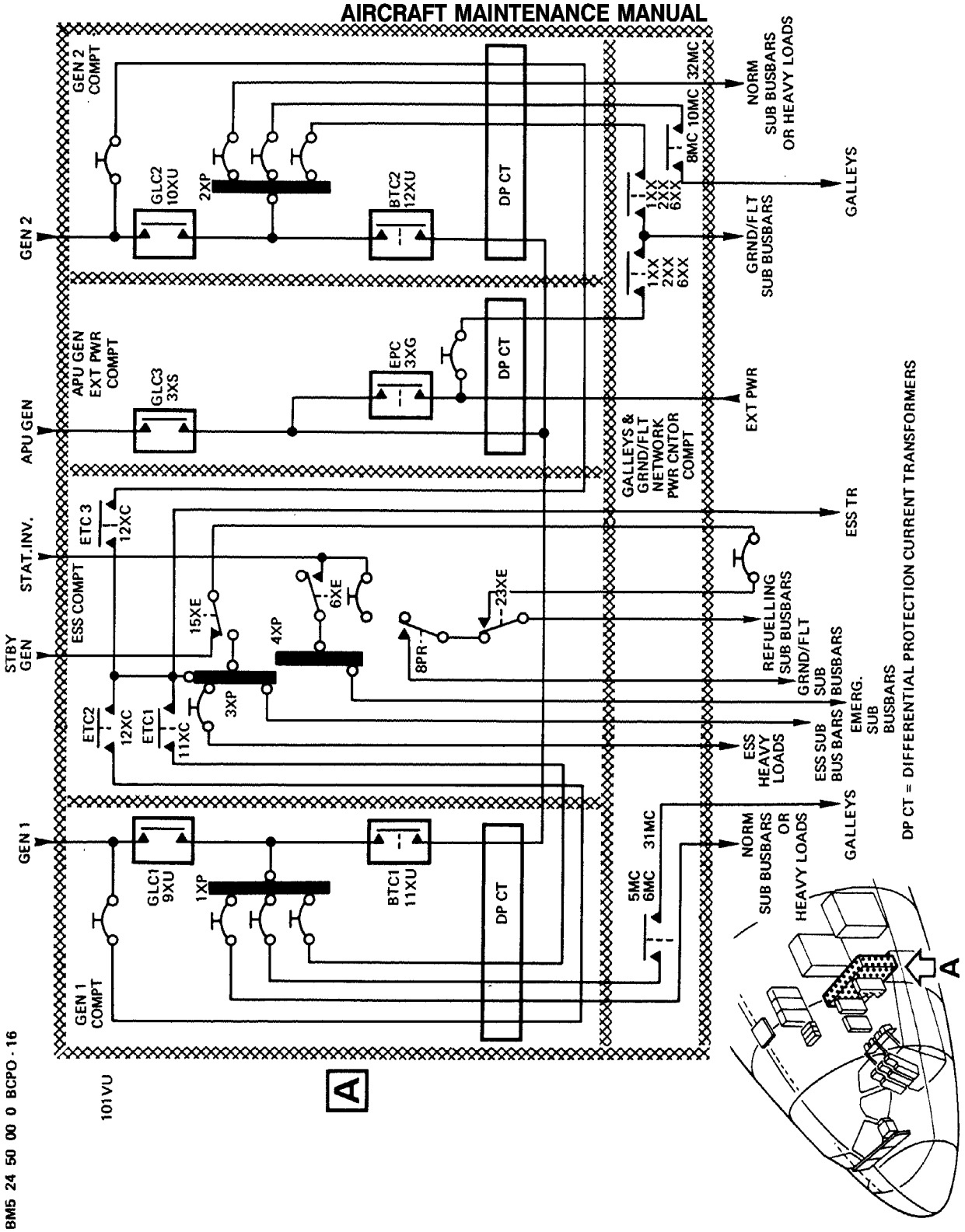
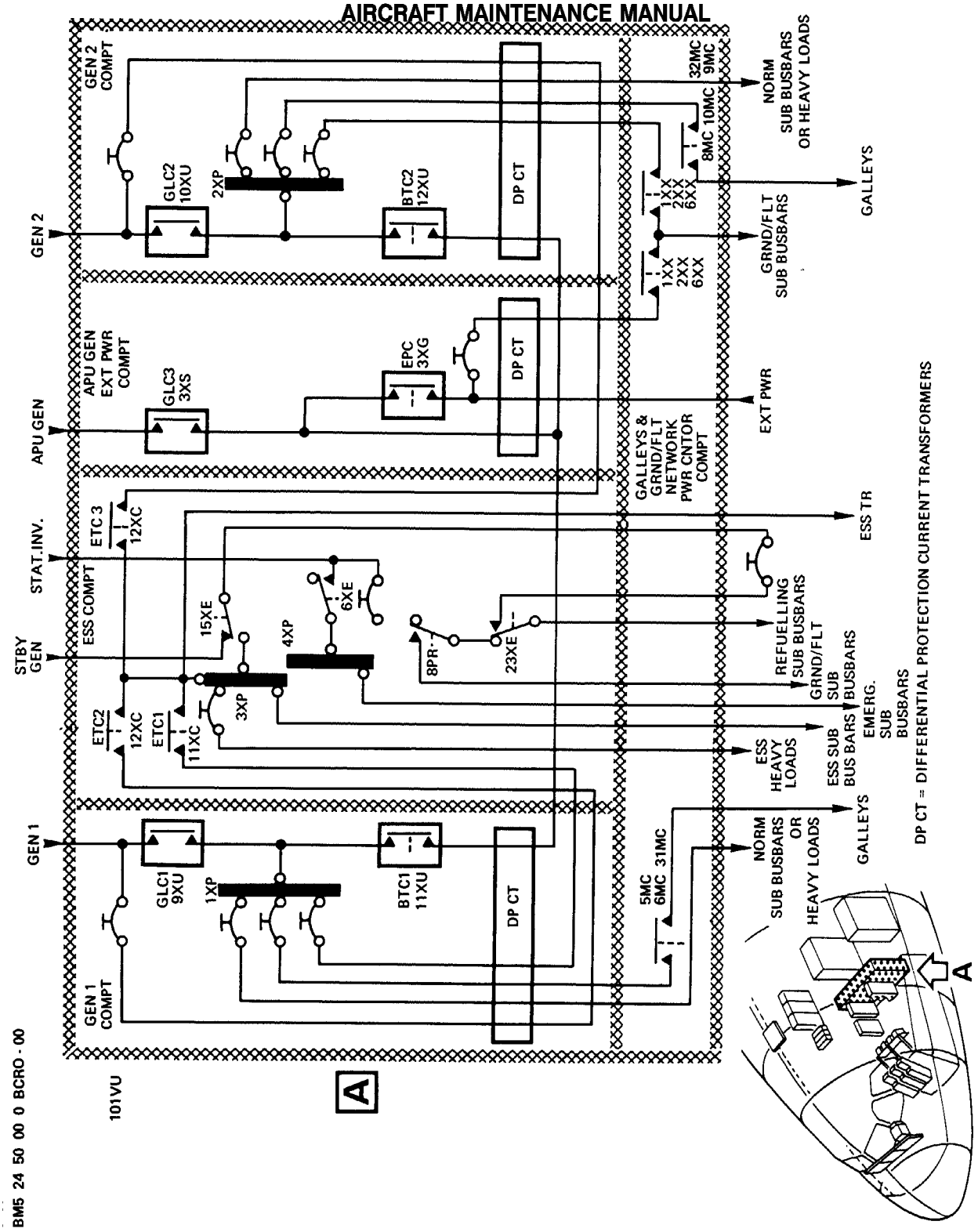


Electrical Load Distribution AC Power Center Organization
Figure 006



Electrical Load Distribution AC Power Center Organization
Figure 007

R

(5)The lower compartment mainly contains the power contactors which enable the galleys to be supplied, as well as the above mentioned ground/flight network.

B. DC Distribution

The DC distribution is organized and implemented in the electrical power center 106VU as well as in the battery contactor box 281VU (Ref. Fig. 008)

(1)The DC power center is divided into two compartments normal and essential.

(a)The normal compartment comprises the normal busbar 1PP and the TR1 and TR2 split contactors, the ground/flight busbars 5PP and 6PP as well as the associated supply contactors and limiters.

The busbar assembly receives power from TR1 and TR2 feeders and, if necessary, from the connection with the essential compartment. This power is distributed towards the associated sub-busbars via the high rated primary circuit breakers and, if necessary, towards the essential compartment.

(b)The essential compartment comprises the essential busbar 3PP, essential TR split contactor and the DC busbar tie contactor.

It also contains :

. static inverter supply contactor,
. refuelling sub-busbar supply selection contactor
. Standby generator supply contactor

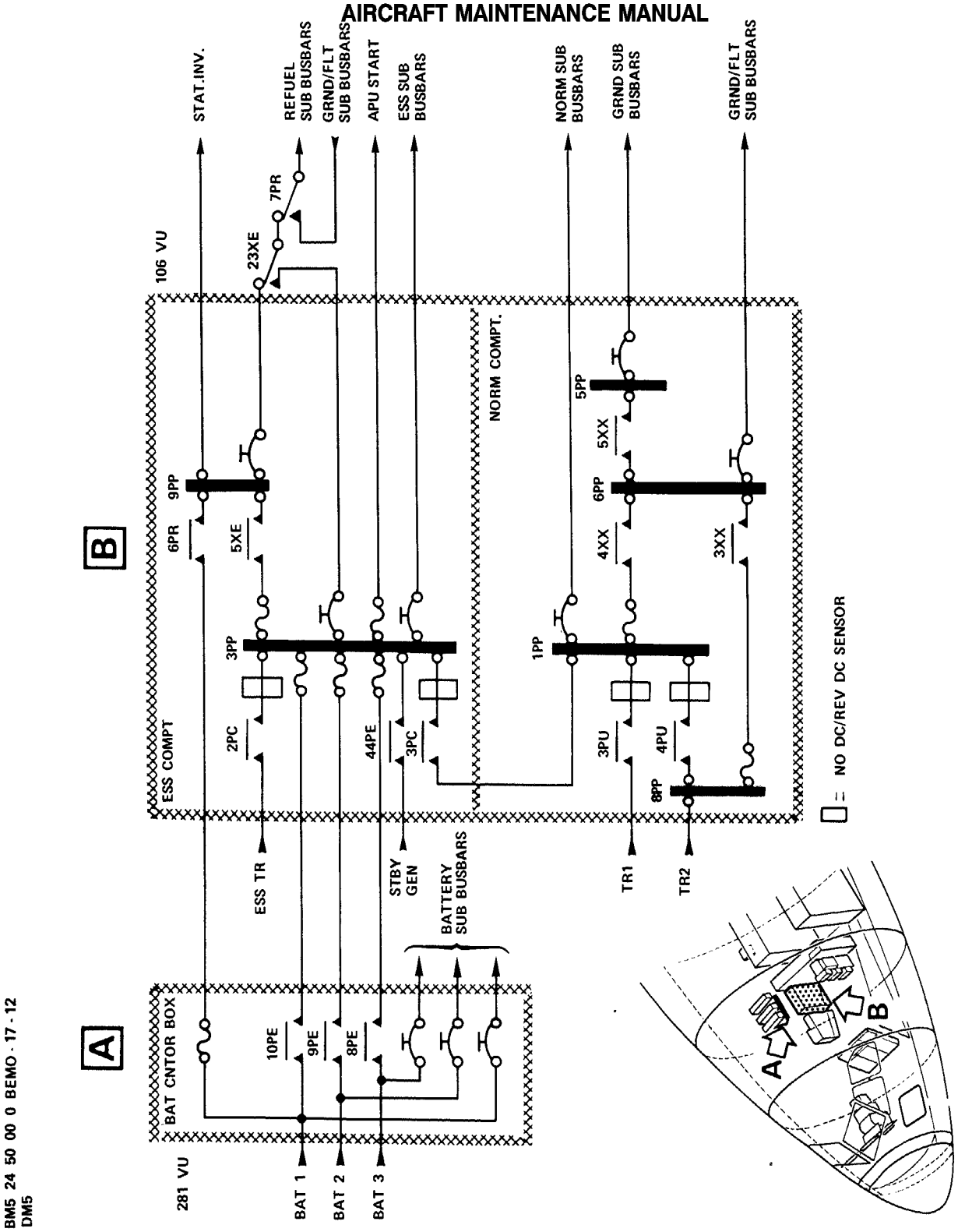
The essential busbar receives power from the essential TR feeder and, eventually, from the connection with the normal compartment or the battery feeders on the standby generator.

This power is distributed

. towards the associated sub-busbars via high rated primary circuit breakers
. towards particular consumers such as batteries, APU starting circuit, static inverter and refuelling/defuelling sub-busbar, via high rated limiters.

(2)The battery contactor box contains, in addition to the contactors :

- a limiter which protects the static inverter and the refuelling/defuelling sub-busbar supply circuits.
- the primary circuit breakers supplying the battery busbars.



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Electrical Load Distribution - DC Power Center and Contactor Box Organization
Figure 008

4. Different Distribution Configurations

The condition of the electrical distribution depends on :
- the various electrical power sources available
- the procedures applied by the flight crew in different failure configurations

and this can be broken down in five main configurations as follows :

A. Normal Flight Configuration

R **ON A/C 001-003,

(Ref. Fig. 009)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 010)

R **ON A/C 101-200,

R (Ref. Fig. 011)

R **ON A/C 006-100,

(Ref. Fig. 012)

**ON A/C ALL

Each generator separately supplies its AC network :
- generator 1 : busbars 1XP, 3XP, 4XP and associated sub-busbars
- generator 2 : busbar 2XP and associated sub-busbars.

The three TR supply in parallel the whole DC network : busbars, 1PP, 3PP and 6PP (and associated sub-busbars) which are coupled.

NOTE : Ground busbar 5PP is supplied on landing.

B. Emergency Configuration

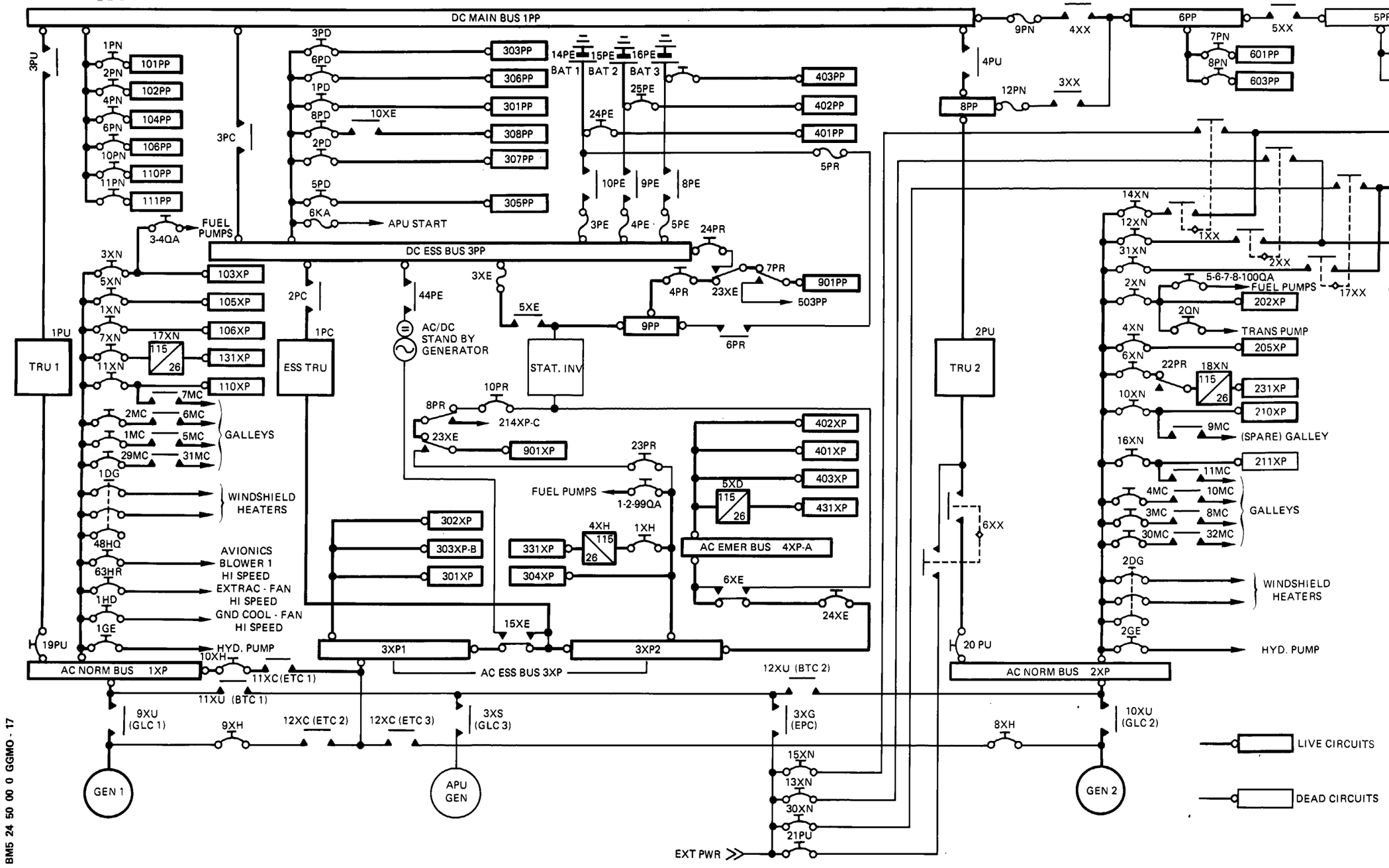
R **ON A/C 001-003,

(Ref. Fig. 013)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 014)



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Electrical Load Distribution - Normal
Flight Configuration
Figure 009

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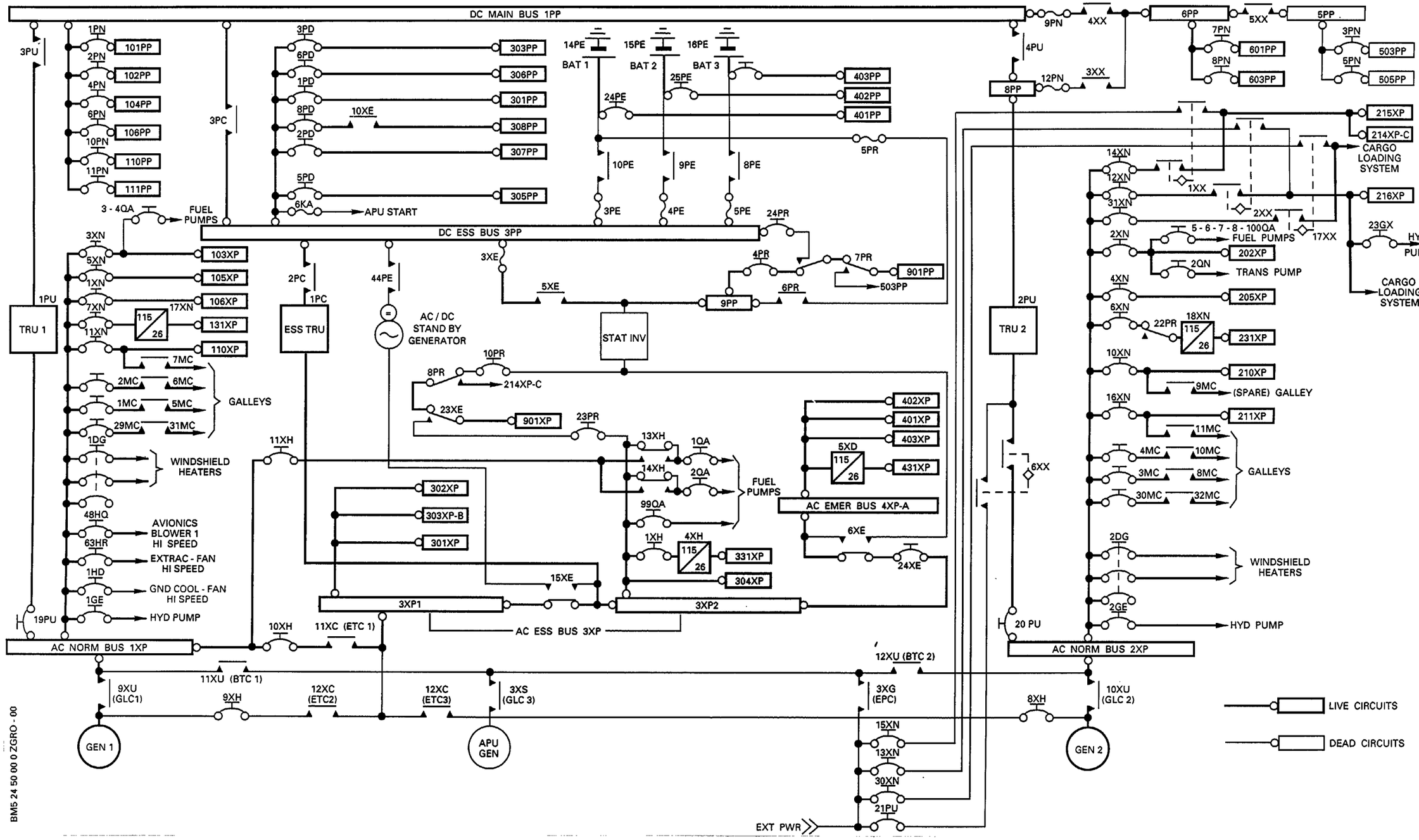
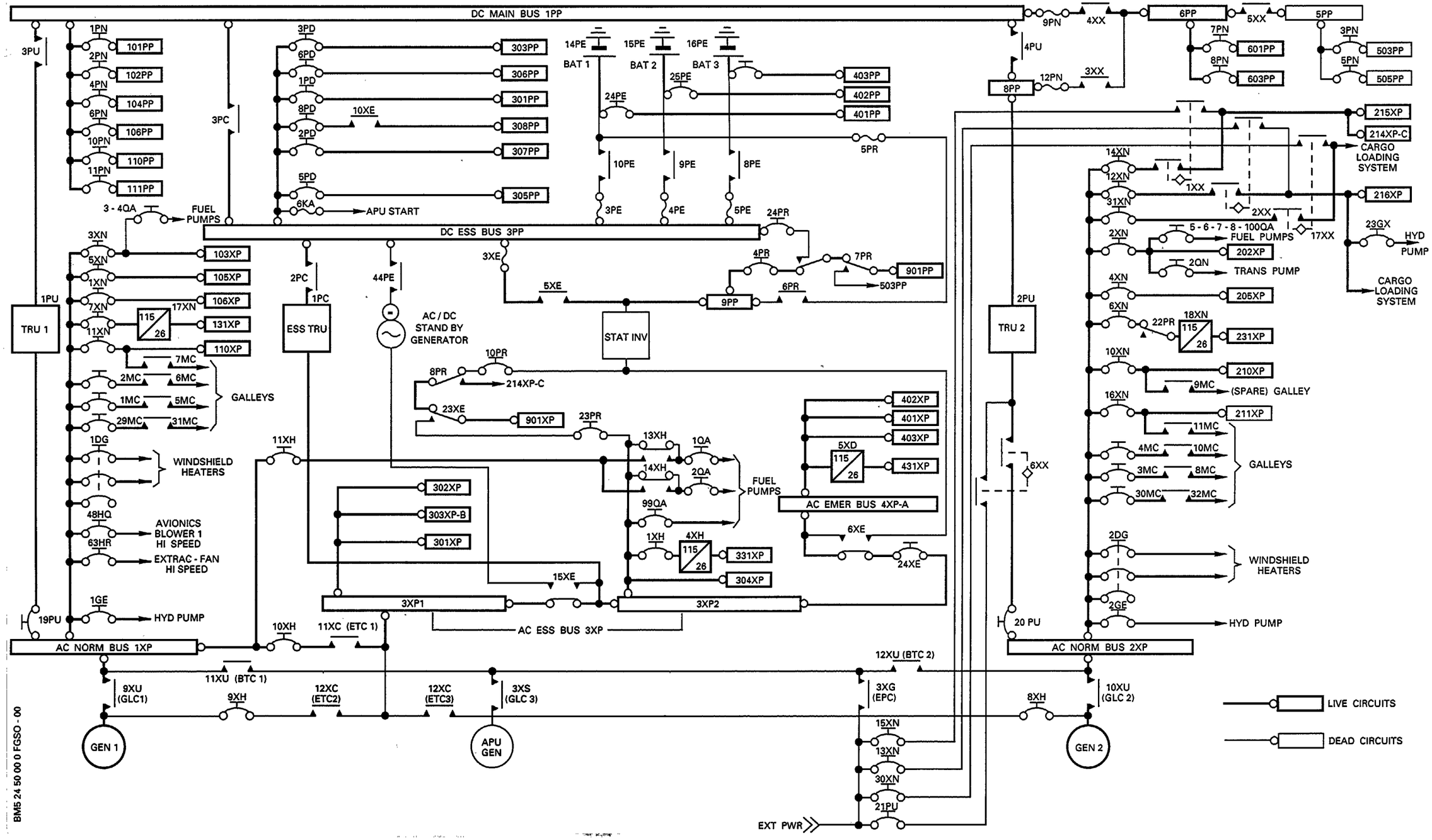


Electrical Load Distribution - Normal
Flight Configuration
Figure 010



Electrical Load Distribution - Normal
Flight Configuration
Figure 011

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R EFFECTIVITY: 101-200,

PIA

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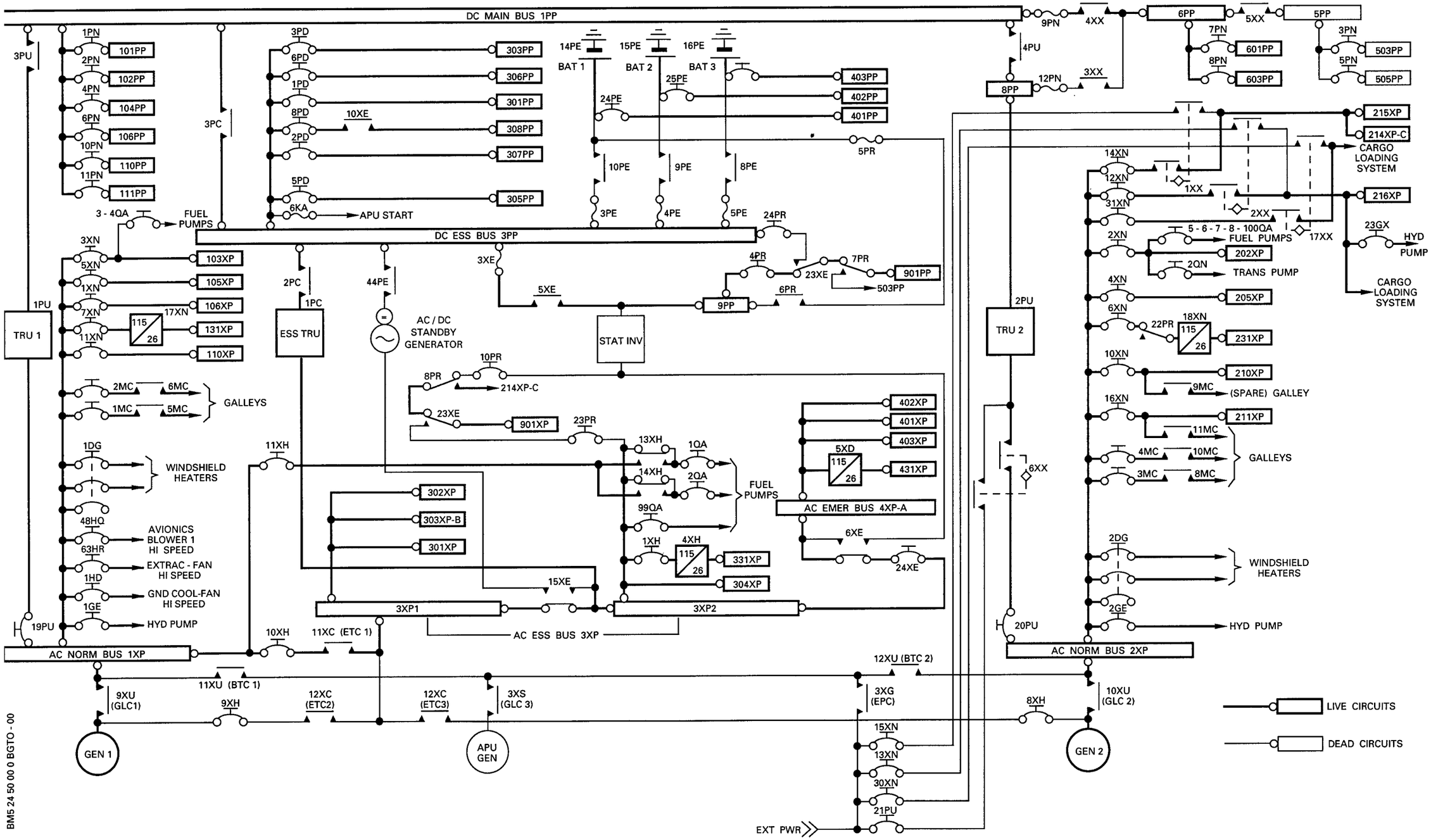
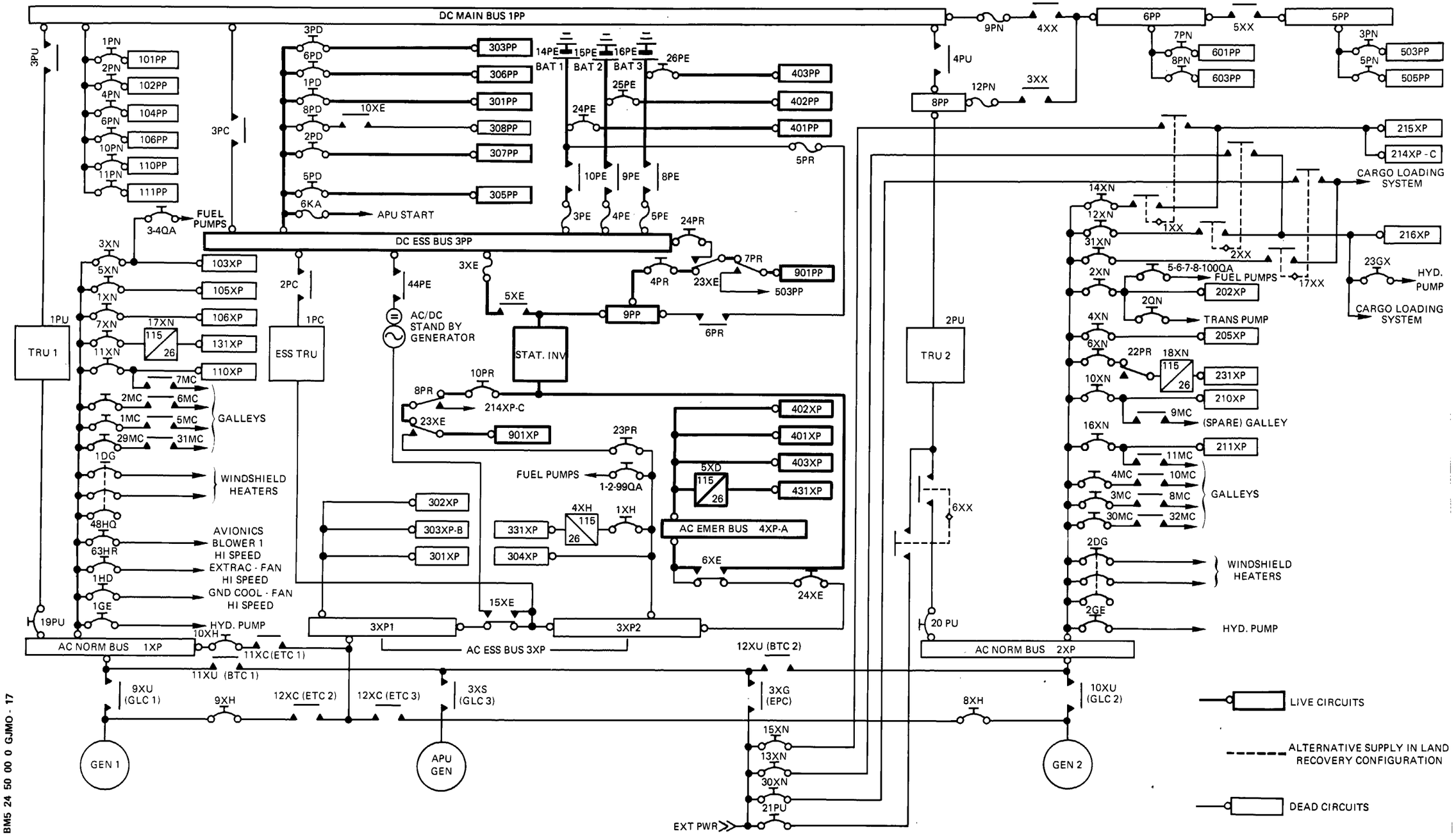


Electrical Load Distribution - Normal
Flight Configuration
Figure 012



BM5 24 50 00 0 GJMO - 17

Electrical Load Distribution - Emergency
Configuration by Battery
Figure 013

R EFFECTIVITY: 001-003,

PIA

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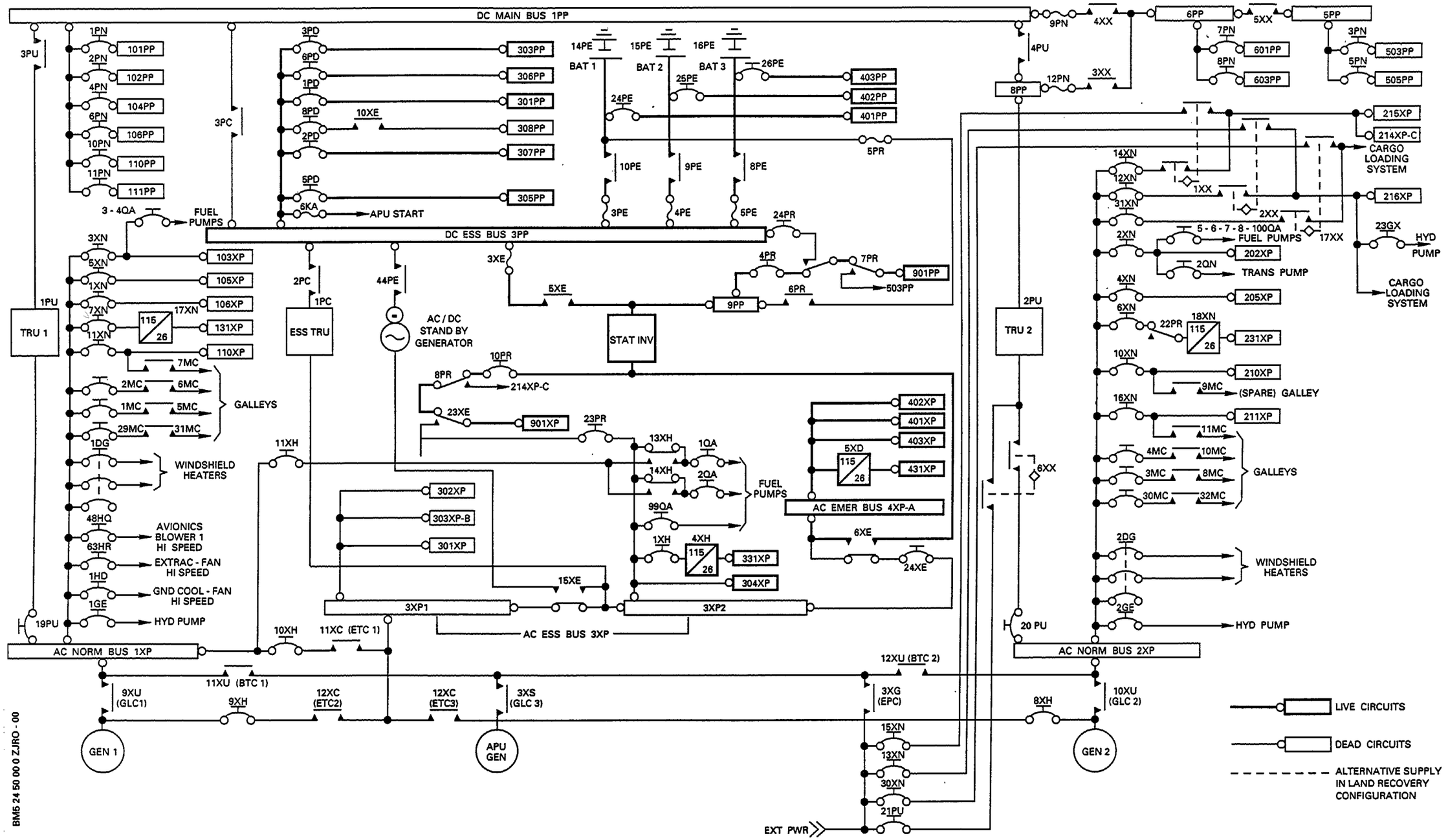

Electrical Load Distribution - Emergency
Configuration by Battery
Figure 014

R EFFECTIVITY: 001-005,

PIA

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R **ON A/C 101-200,

R (Ref. Fig. 015)

R **ON A/C 006-100,

(Ref. Fig. 016)

R **ON A/C 001-003,

(Ref. Fig. 017)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 018)

R **ON A/C 101-200,

R (Ref. Fig. 019)

R **ON A/C 006-100,

(Ref. Fig. 020)

**ON A/C ALL

In the event of loss of both main generators with the APU generator not available, two power sources remain available immediately :

(1)Standby generator

The generator is composed of an AC and a DC sources

- the DC source supplies busbar 3PP and all the associated sub-busbars, (except busbars 308PP) as well as 901PP.
- the AC source supplies busbars 3XP2, 4XP and associated sub-busbars as well as 901XP.

(2)Batteries

The batteries supply :

- busbar 3PP and all the associated sub-busbars (except sub-busbar 308PP) as well as 901PP.
- via static inverter, busbar 4XP and all the associated sub-busbars, as well as 901XP.

If the aircraft must continue the flight in this configuration, part of the services previously shed are recovered for landing (Land recovery).

NOTE : In land recovery configuration :

- part of the services shed are recovered by action on the corresponding pushbutton switch.

C. Smoke Emergency Configuration

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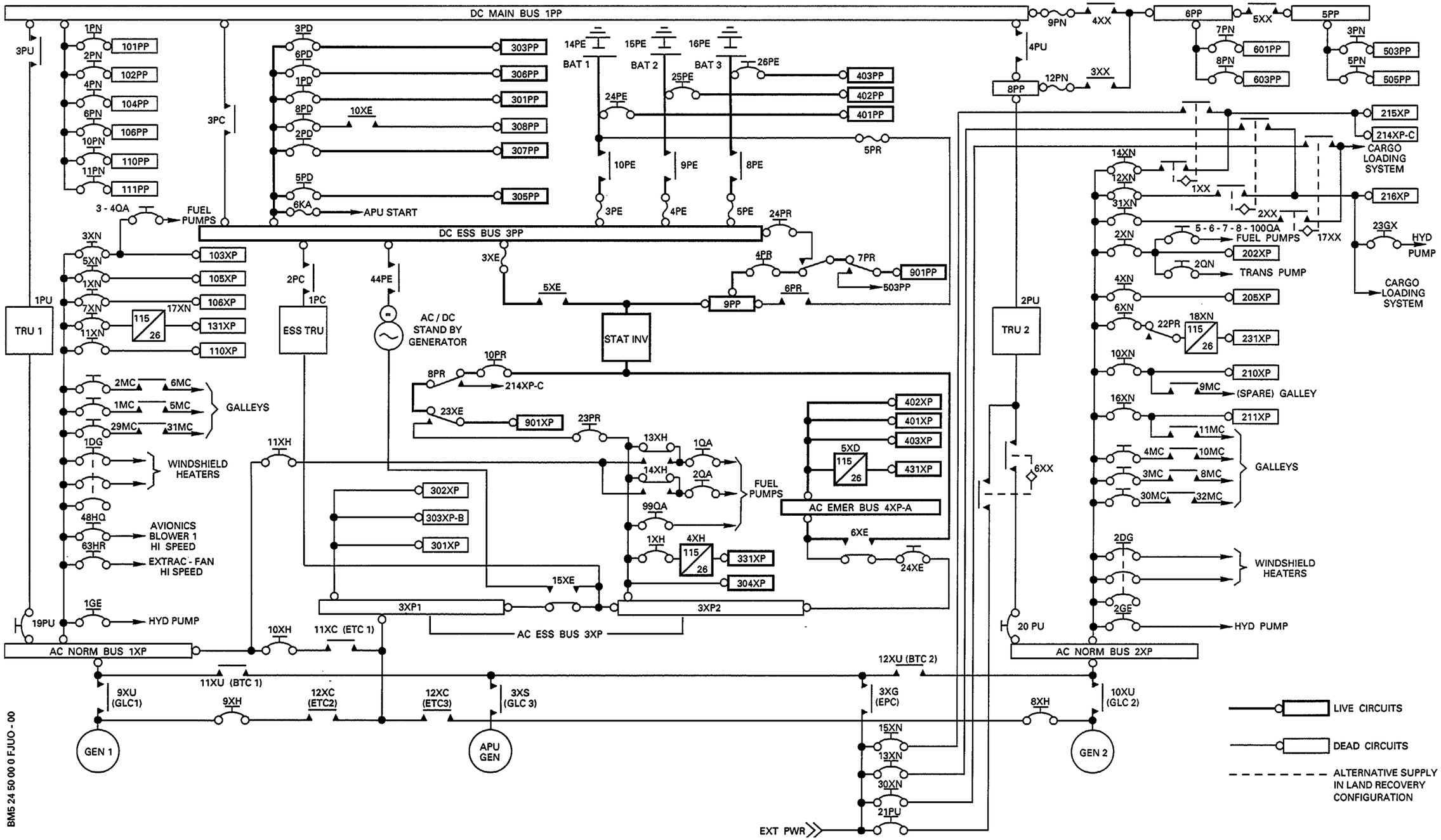

BM5 24 50 00 0 FJUO - 00

Electrical Load Distribution - Emergency
Configuration by Battery
Figure 015

R

R | EFFECTIVITY: 101-200,

PIA

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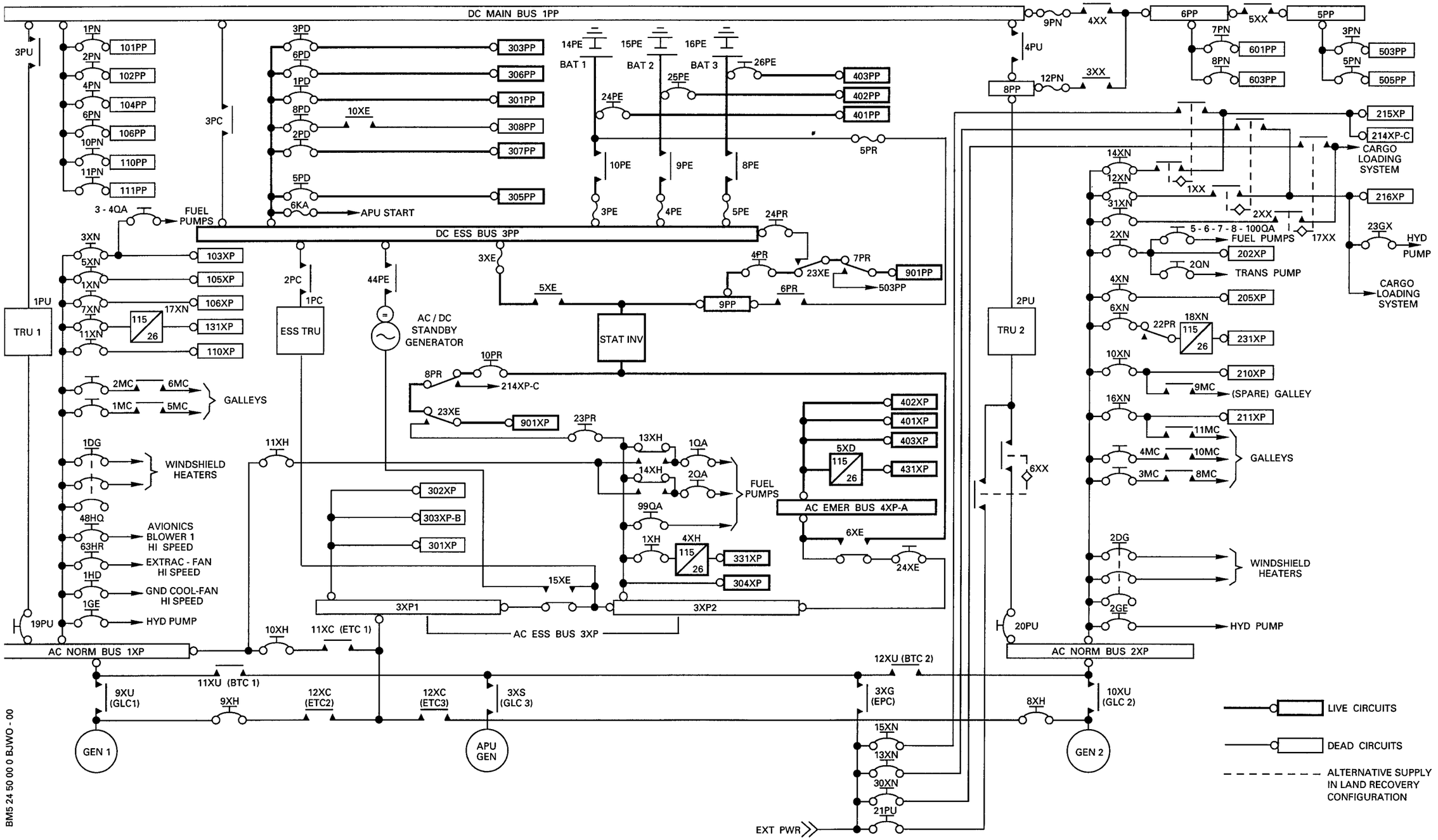

BM5 24 50 00 0 BJWO - 00

Electrical Load Distribution - Emergency
Configuration by Battery
Figure 016

R EFFECTIVITY: 006-100,

PIA

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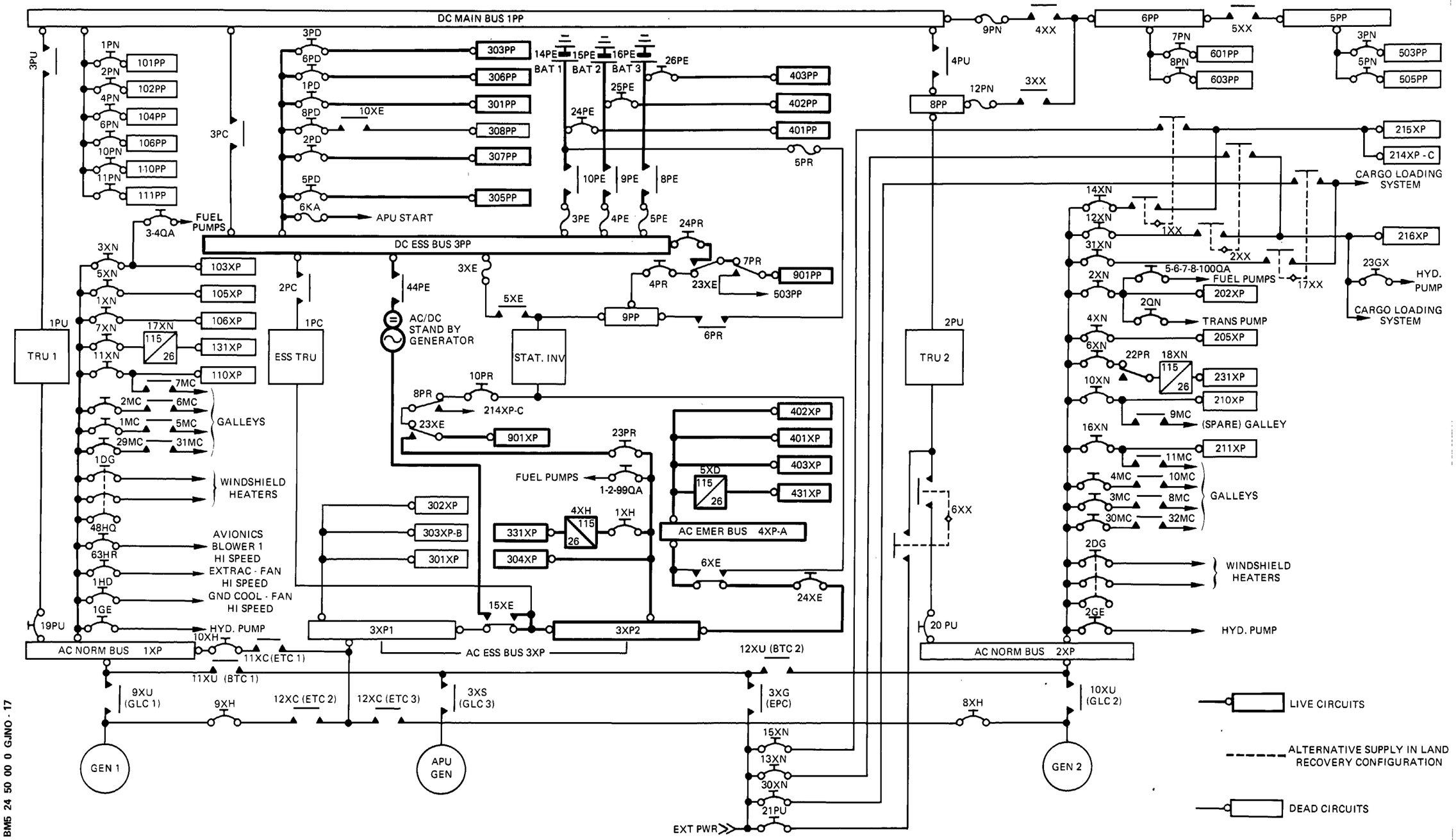
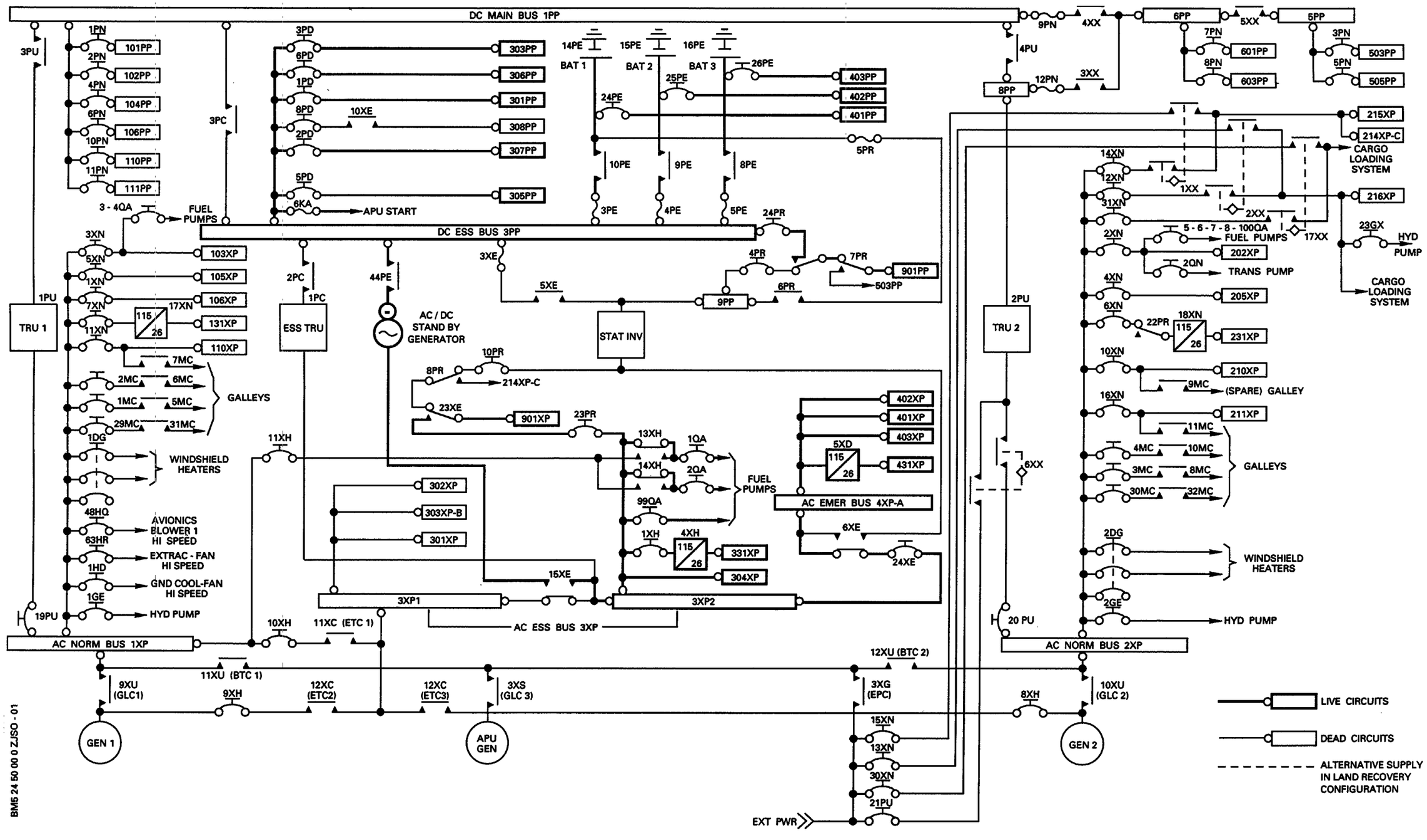
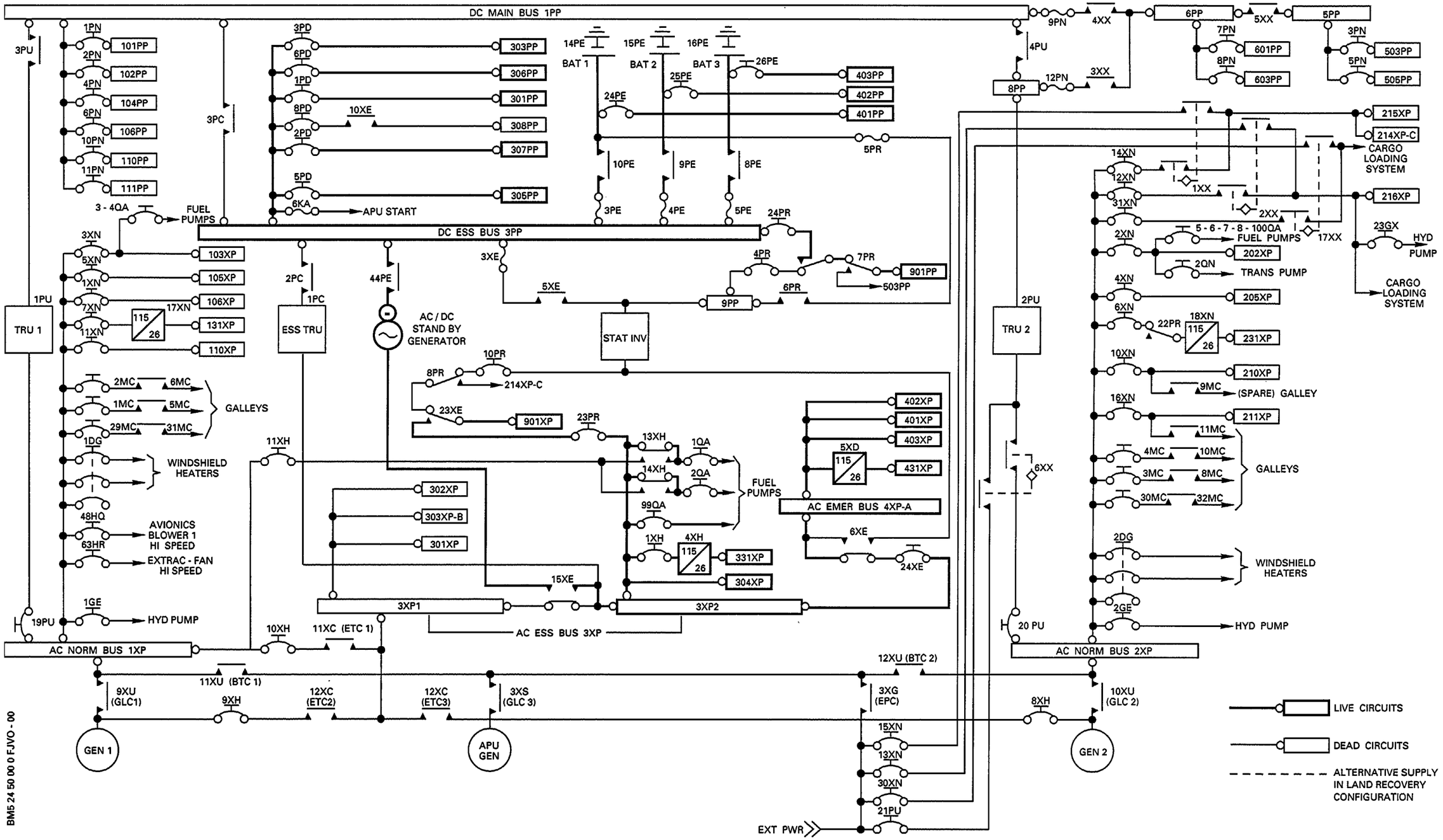


BM5 24 50 00 0 GJNO - 17

Electrical Load Distribution - Emergency
Configuration by Standby Generator
Figure 017



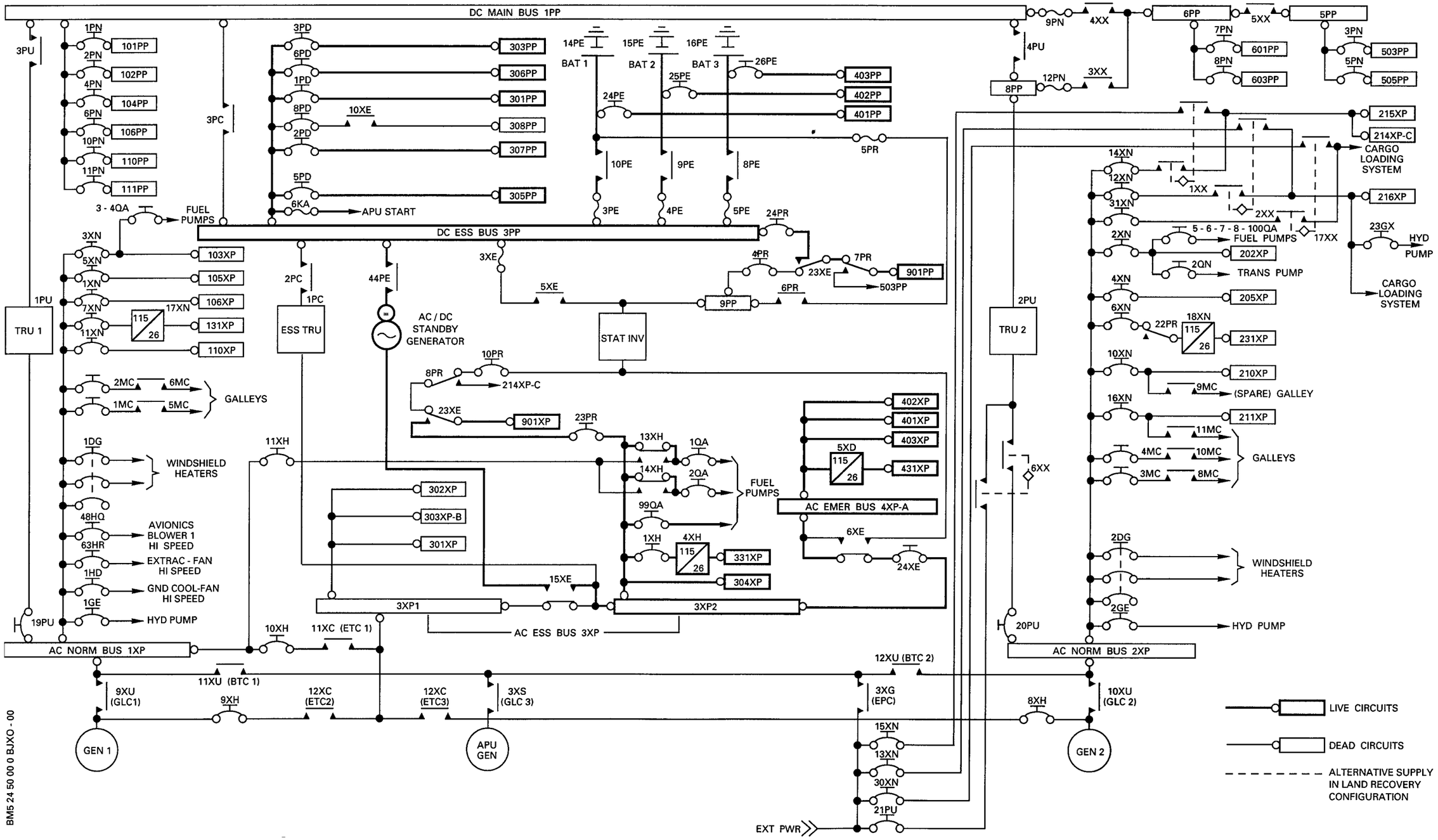
Electrical Load Distribution - Emergency
Configuration by Standby Generator
Figure 018



BM5 24 50 00 0 FJVO - 00

Electrical Load Distribution - Emergency
Configuration by Standby Generator
Figure 019

R



Electrical Load Distribution - Emergency
Configuration by Standby Generator
Figure 020

R **ON A/C 001-003,

(Ref. Fig. 021)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 022)

R **ON A/C 101-200,

R (Ref. Fig. 023)

R **ON A/C 006-100,

(Ref. Fig. 024)

**ON A/C ALL

In case of detection of smoke originating from an electrical source causing illumination of **AVIONICS SMOKE** warning light located on **ELEC PWR** panel **424VU** and triggering of the **ECAM** system, the smoke emergency procedure consists in cutting off supply to the whole **AC** and **DC** normal network. This has for effect to isolate most of the equipment able to smoke (for more details refer to **24-00**, paragraph **6.**).
In this configuration generator 1 (eventually generator 2 if the 1 is not available) supplies directly :
- **3XP**, **4XP** and the associated sub-busbars
- and, by means of the essential **TR**, **3PP** and the associated sub-busbars.
Part of the equipment shed are recovered by pressing **LAND RECOVERY** push-button switch on **ELEC PWR** panel (Ref. 24-25, para. 3.).

D. Ground Service Configuration

R **ON A/C 001-003,

(Ref. Fig. 025)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 026)

R **ON A/C 101-200,

R (Ref. Fig. 027)

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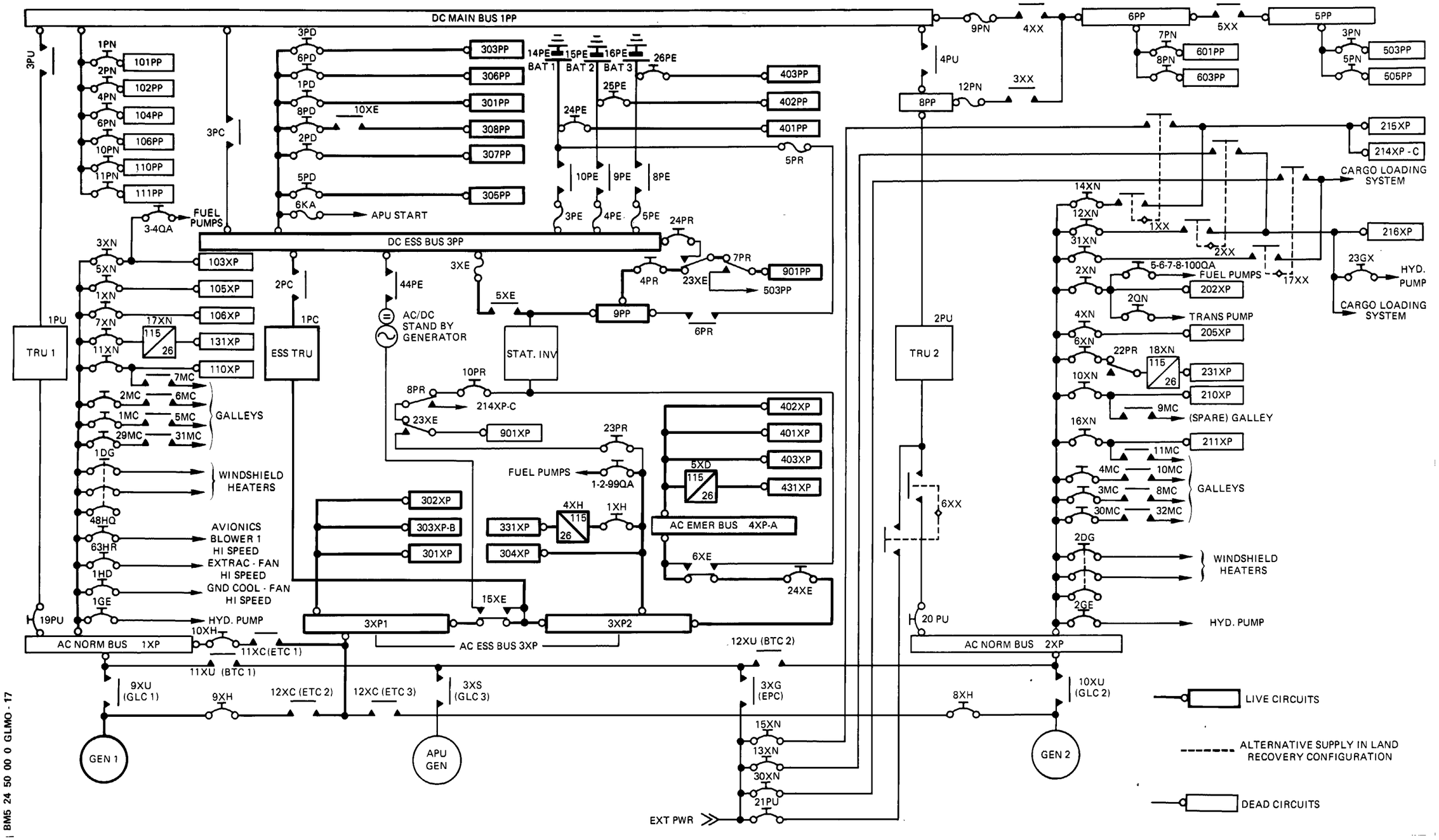
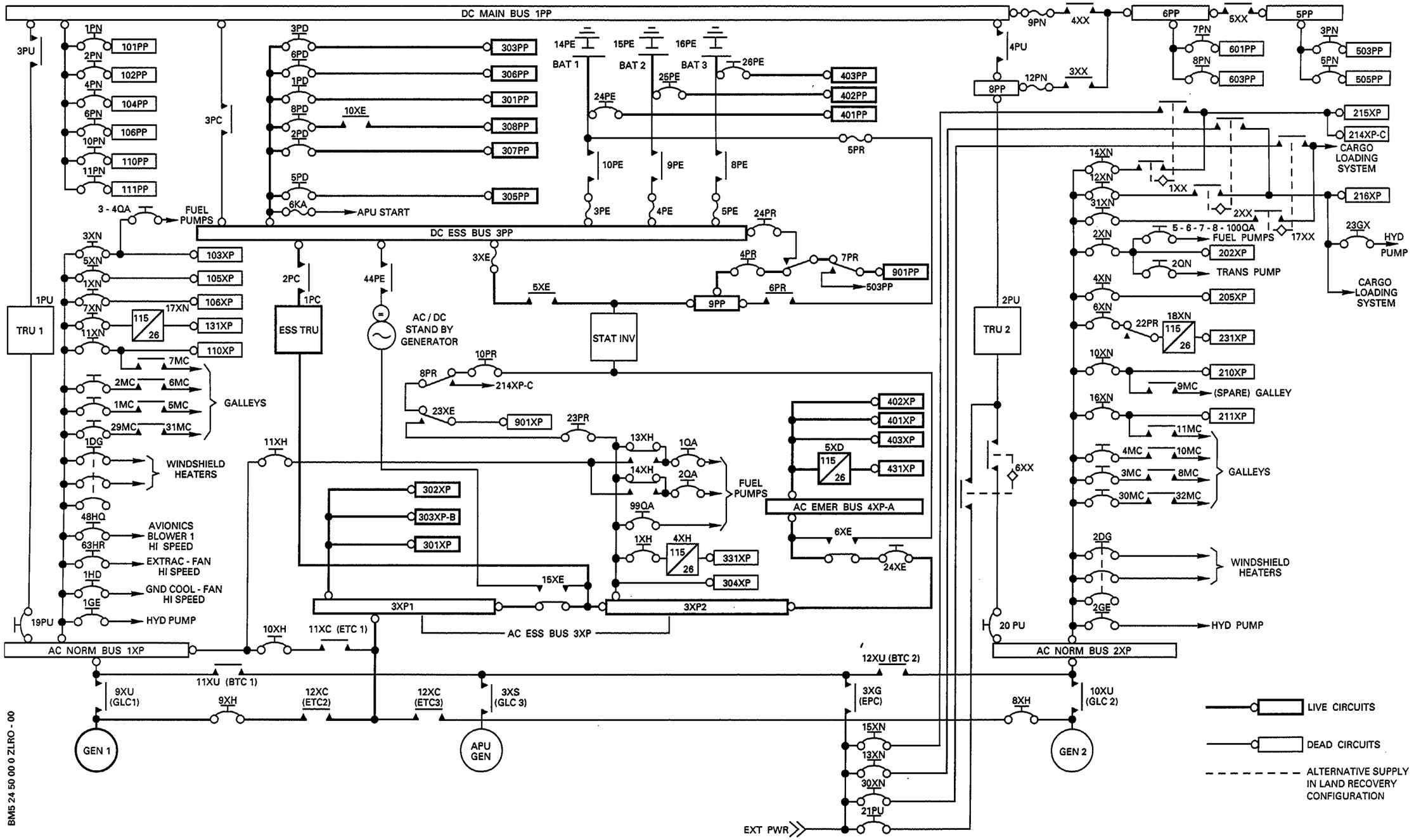
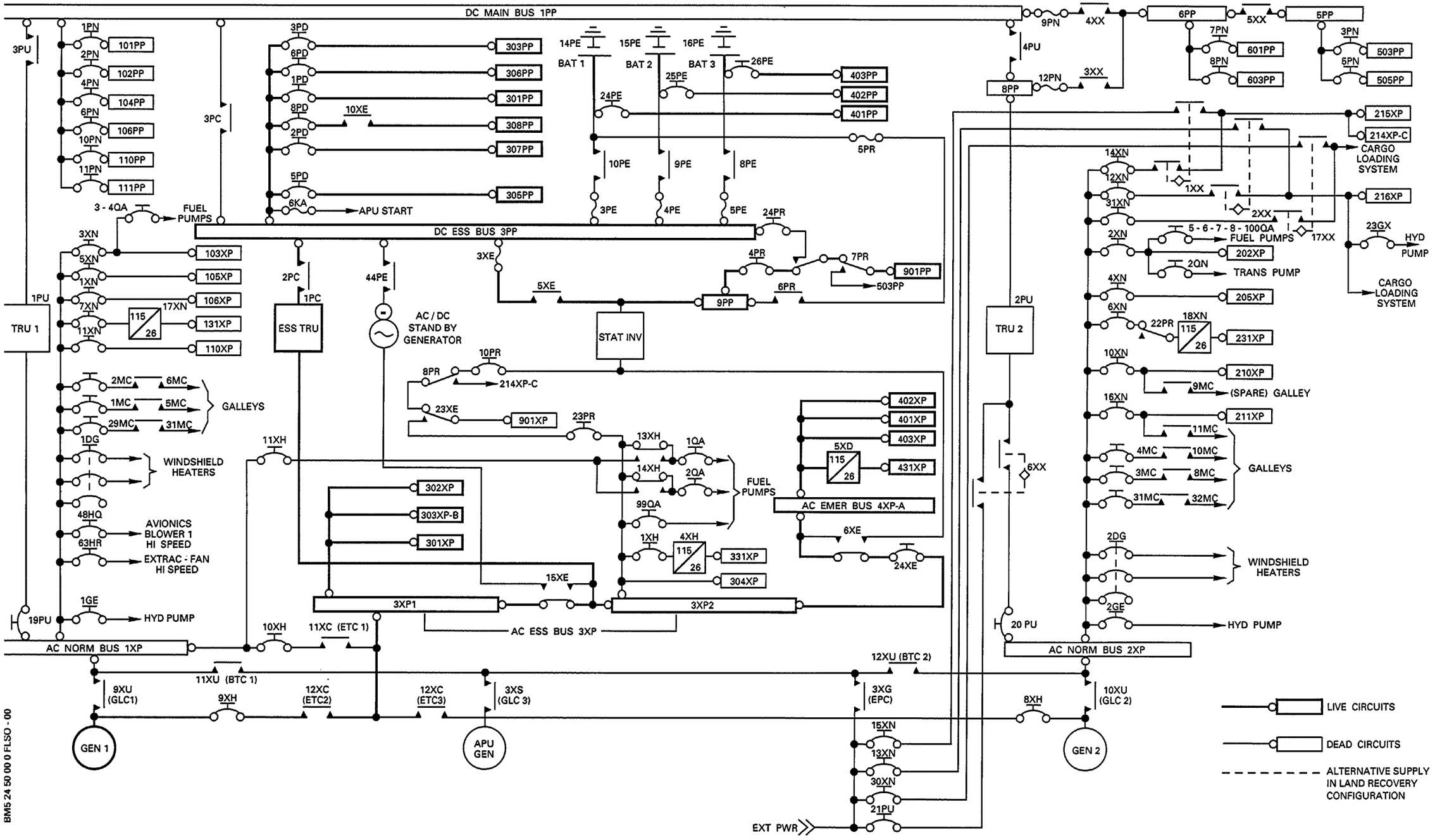


Electrical Load Distribution - Smoke Drill
Figure 021

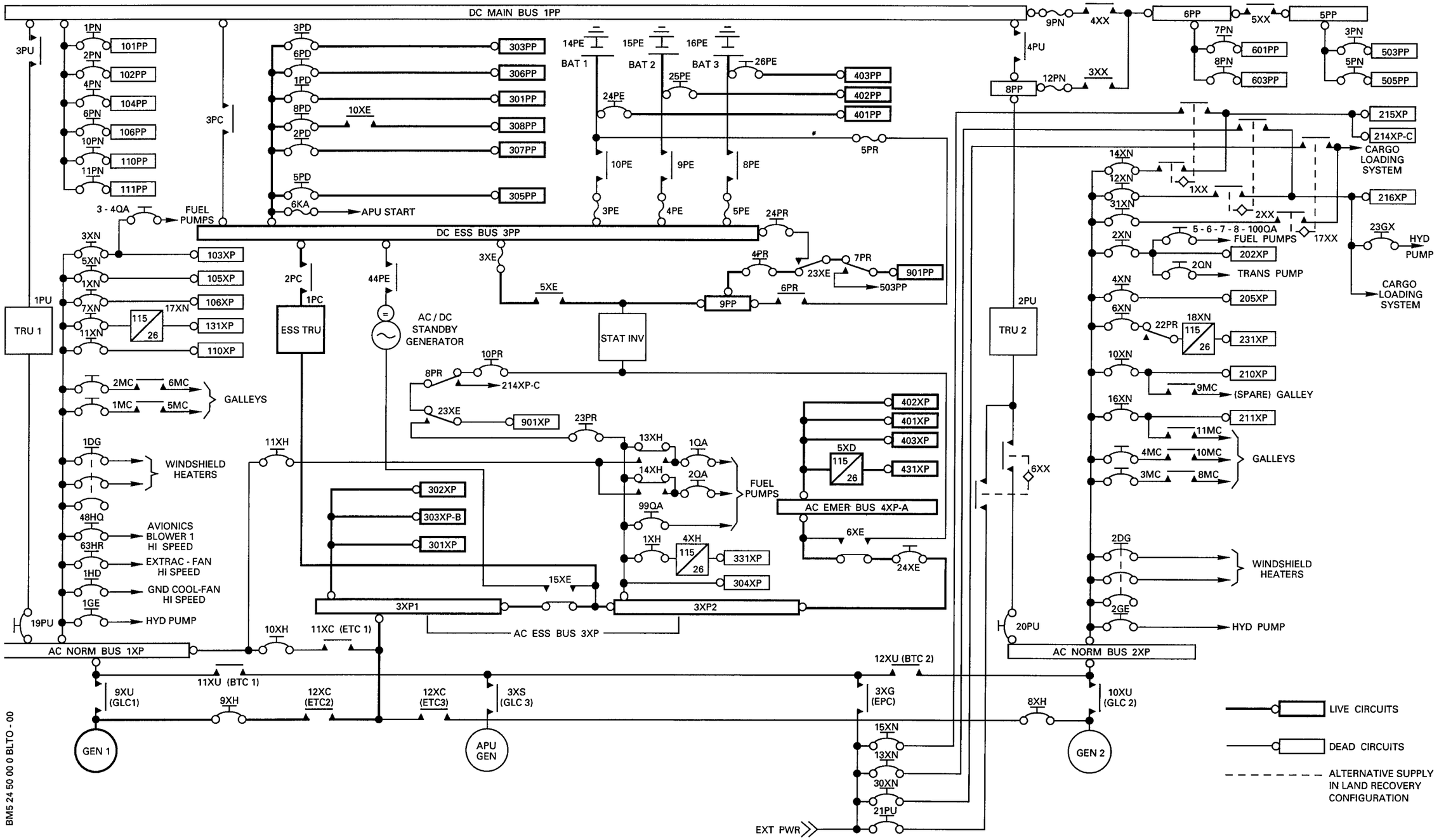


Electrical Load Distribution - Smoke Drill
Figure 022



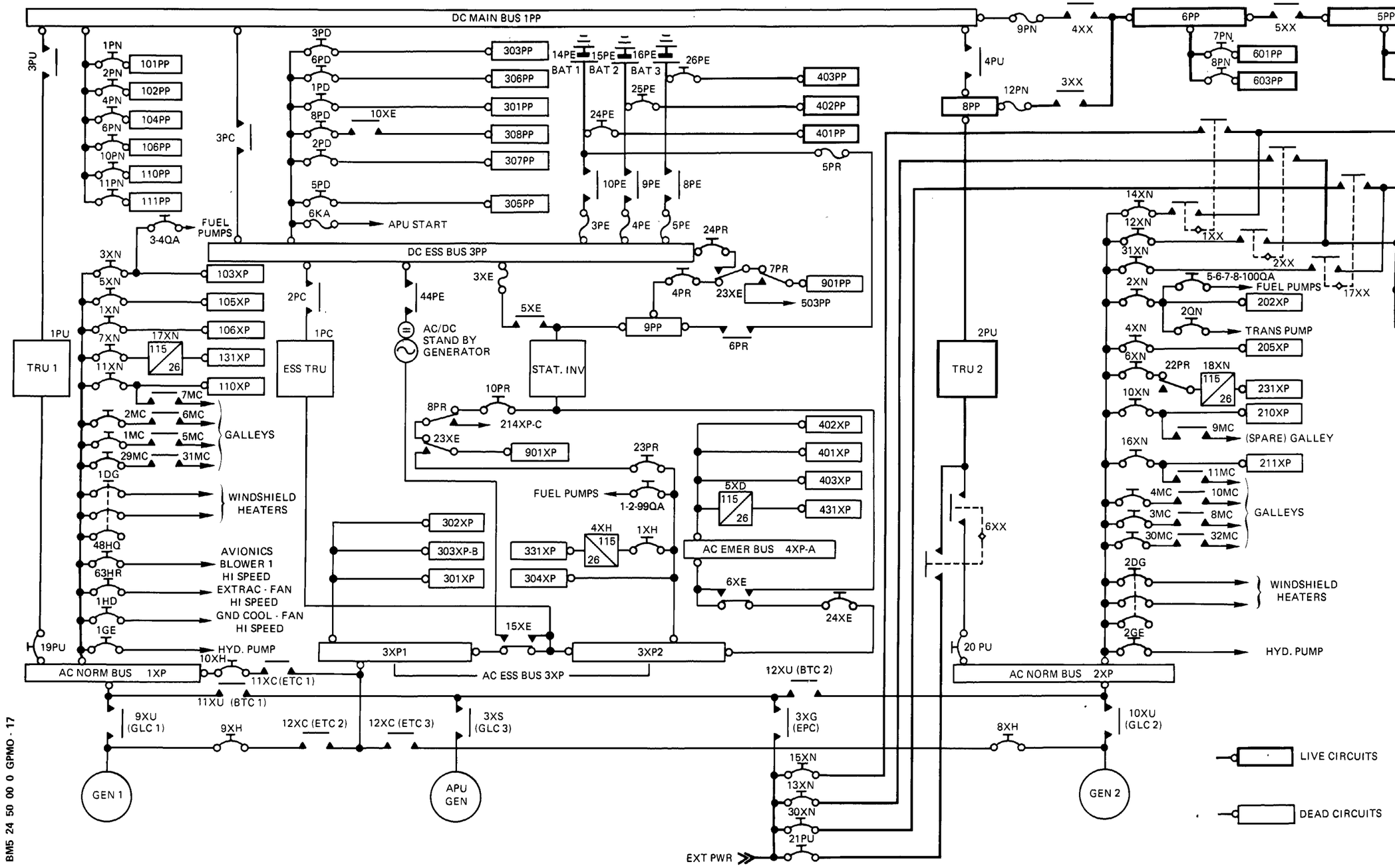
Electrical Load Distribution - Smoke Drill
Figure 023

R



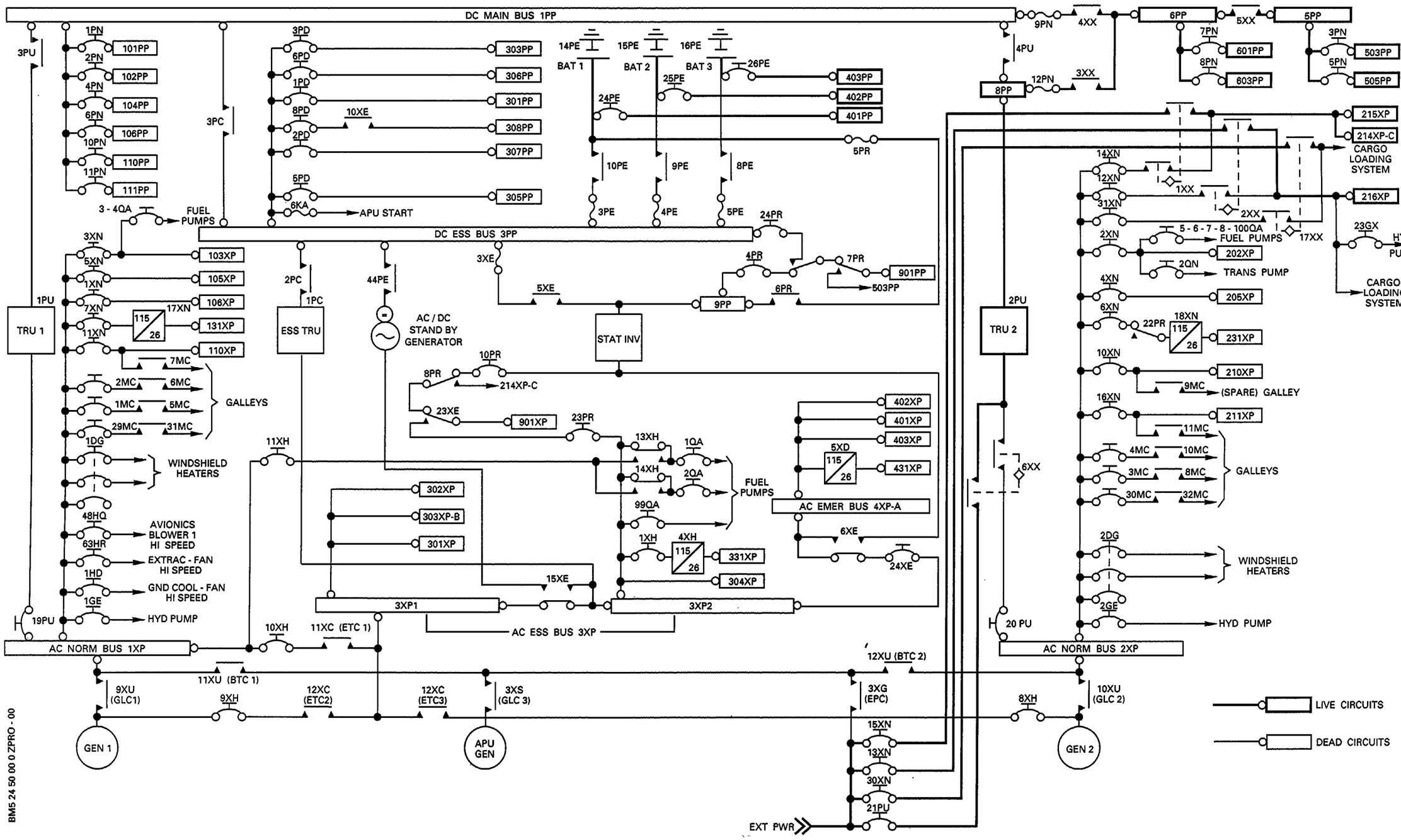
BM5 24 50 00 0 BLTO - 00

Electrical Load Distribution - Smoke Drill
Figure 024

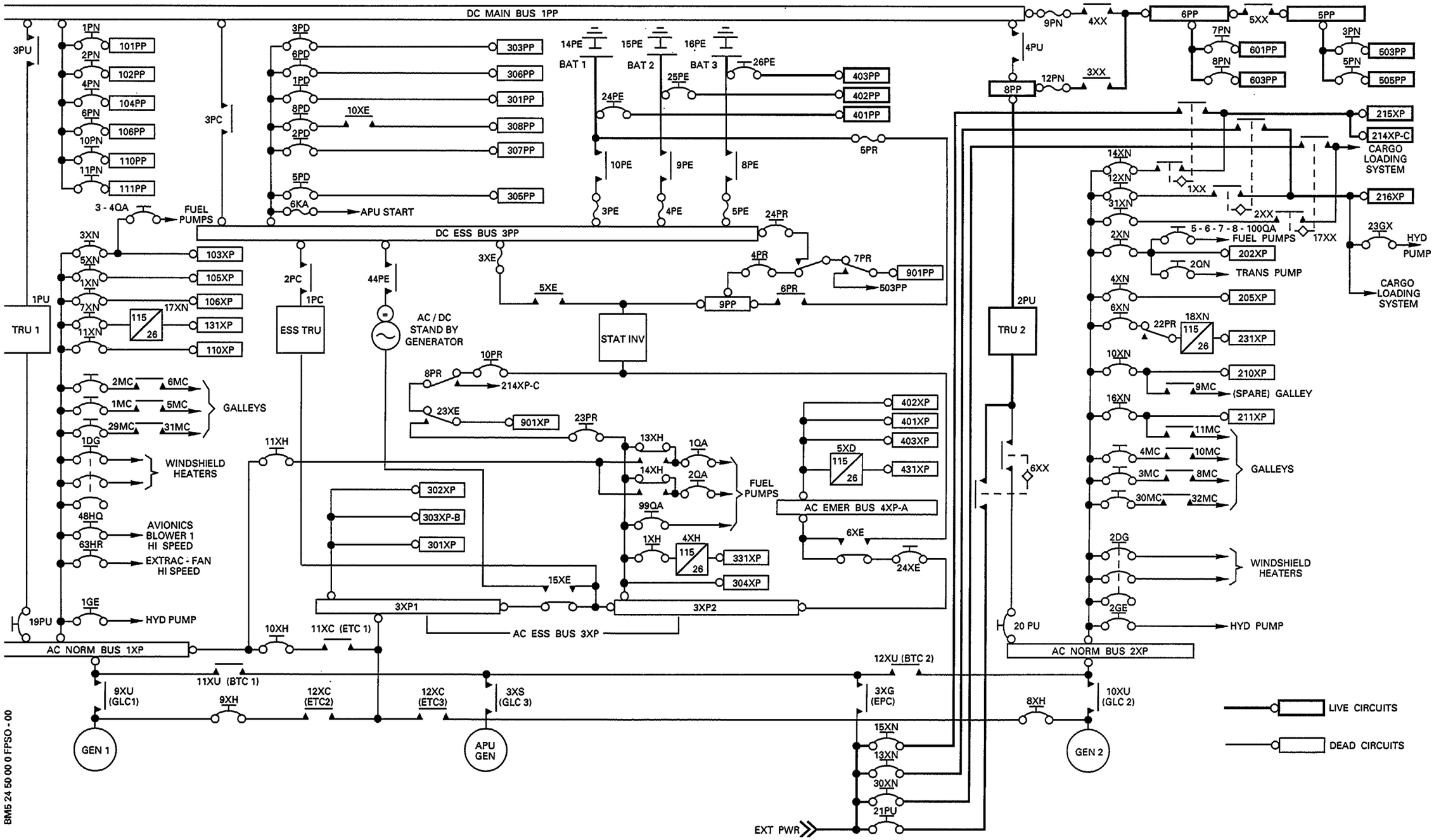


BM5 24 50 00 0 GPMO - 17

Electrical Load Distribution - Ground Service Configuration
Figure 025



Electrical Load Distribution - Ground Service Configuration
Figure 026



BMS 24 50 00 0 FPSO - 00

Electrical Load Distribution - Ground Service Configuration
Figure 027

R

R **ON A/C 006-100,

(Ref. Fig. 028)

**ON A/C ALL

It is possible, for ground service operations, to supply only a part of the distribution network without supplying all technical loads.
The ground power unit can supply directly :
. a part of 2XP : 214XP, 215XP, 216XP
. and via TR2 : 5PP and 6PP and the associated sub-busbars.

E. Refueling/Defueling on Battery

R **ON A/C 001-003,

(Ref. Fig. 029)

R **ON A/C 001-005,

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 030)

R **ON A/C 101-200,

R (Ref. Fig. 031)

R **ON A/C 006-100,

(Ref. Fig. 032)

R **ON A/C ALL

It is possible to carry out refueling operations without ground power unit, by using battery 1 as an electrical power source.
It supplies 901PP and by means of static inverter 901XP-A.
NOTE : In all these configurations, sub-busbars 401PP, 402PP and 403PP are permanently supplied by the batteries.

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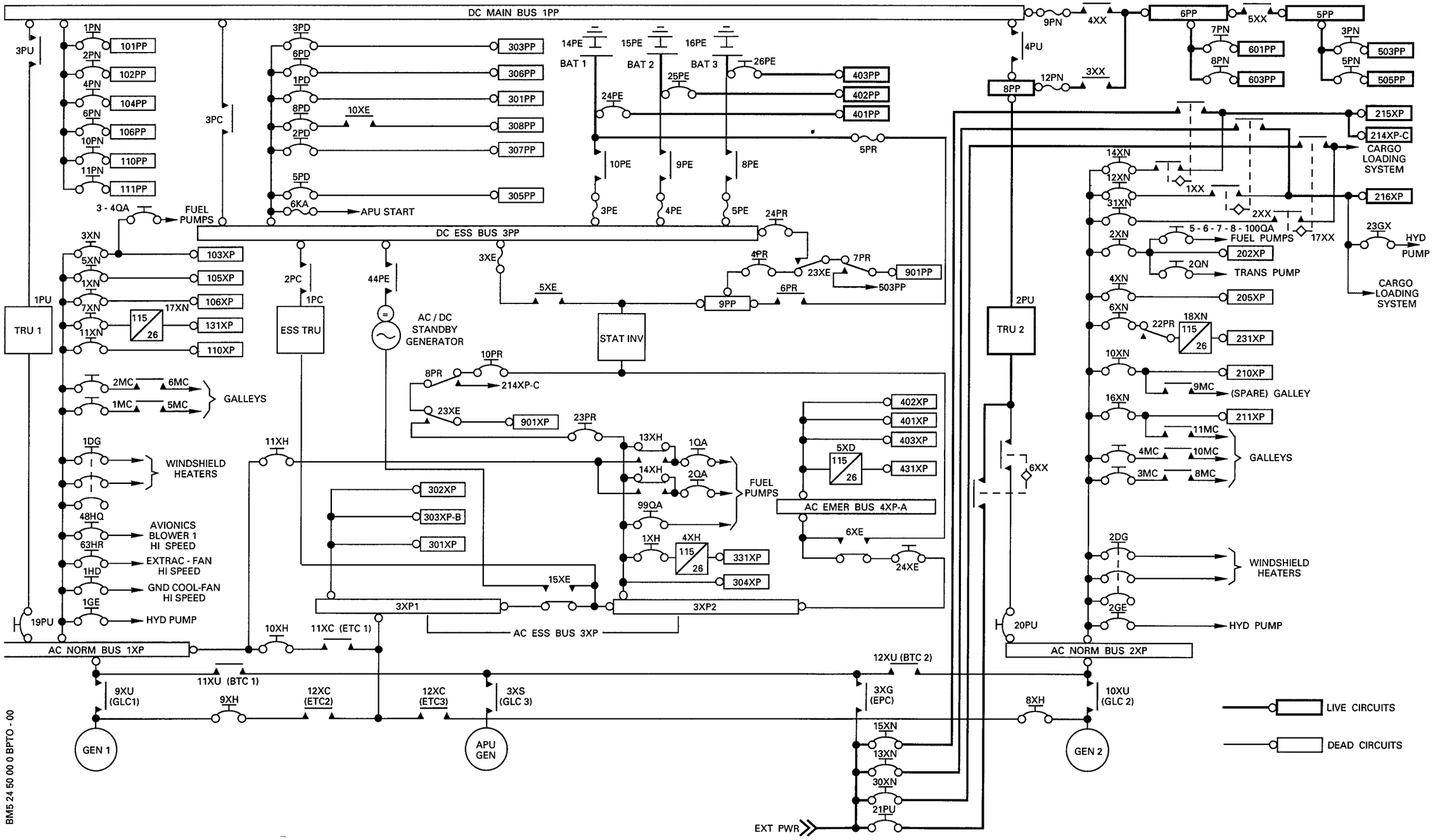
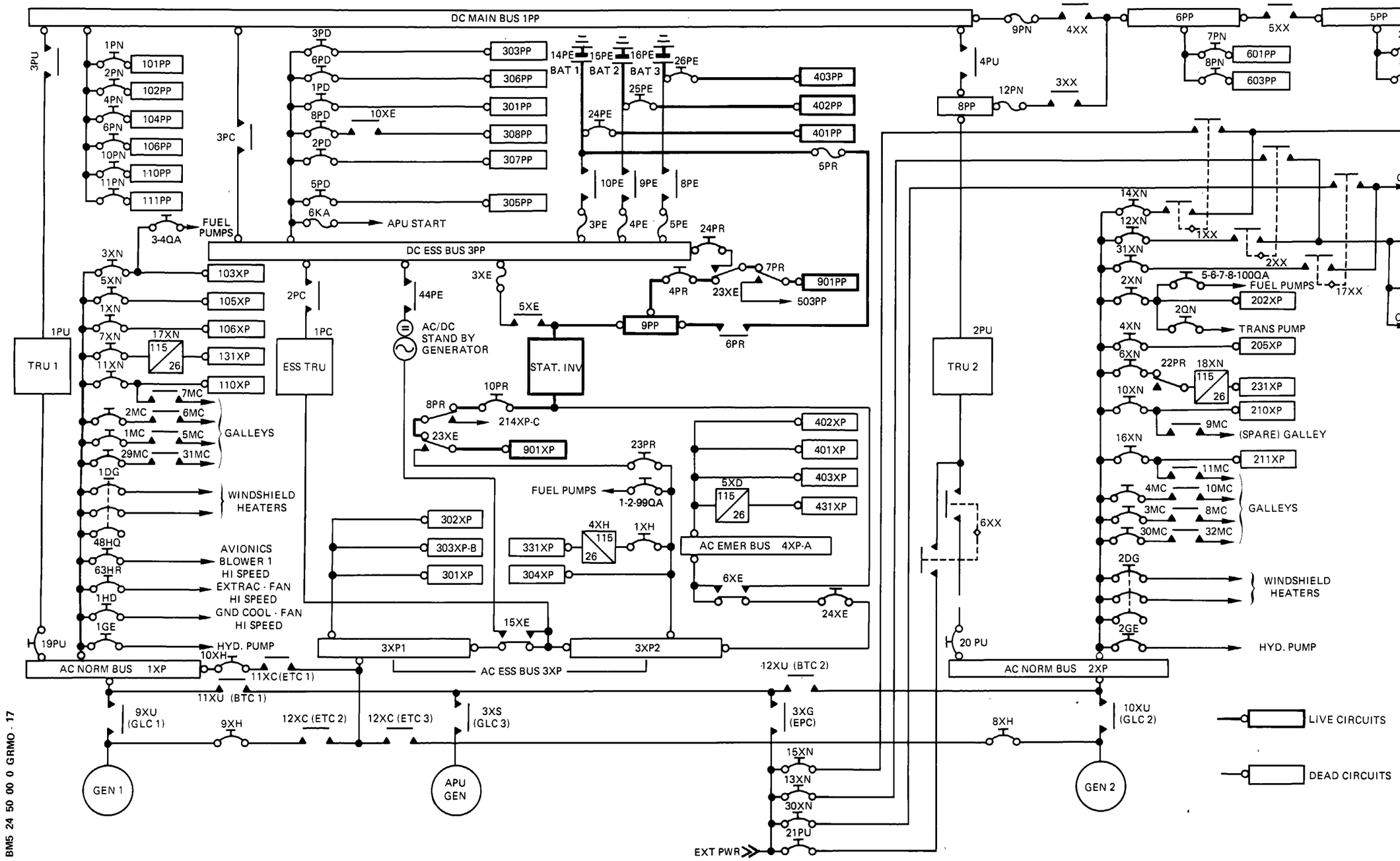
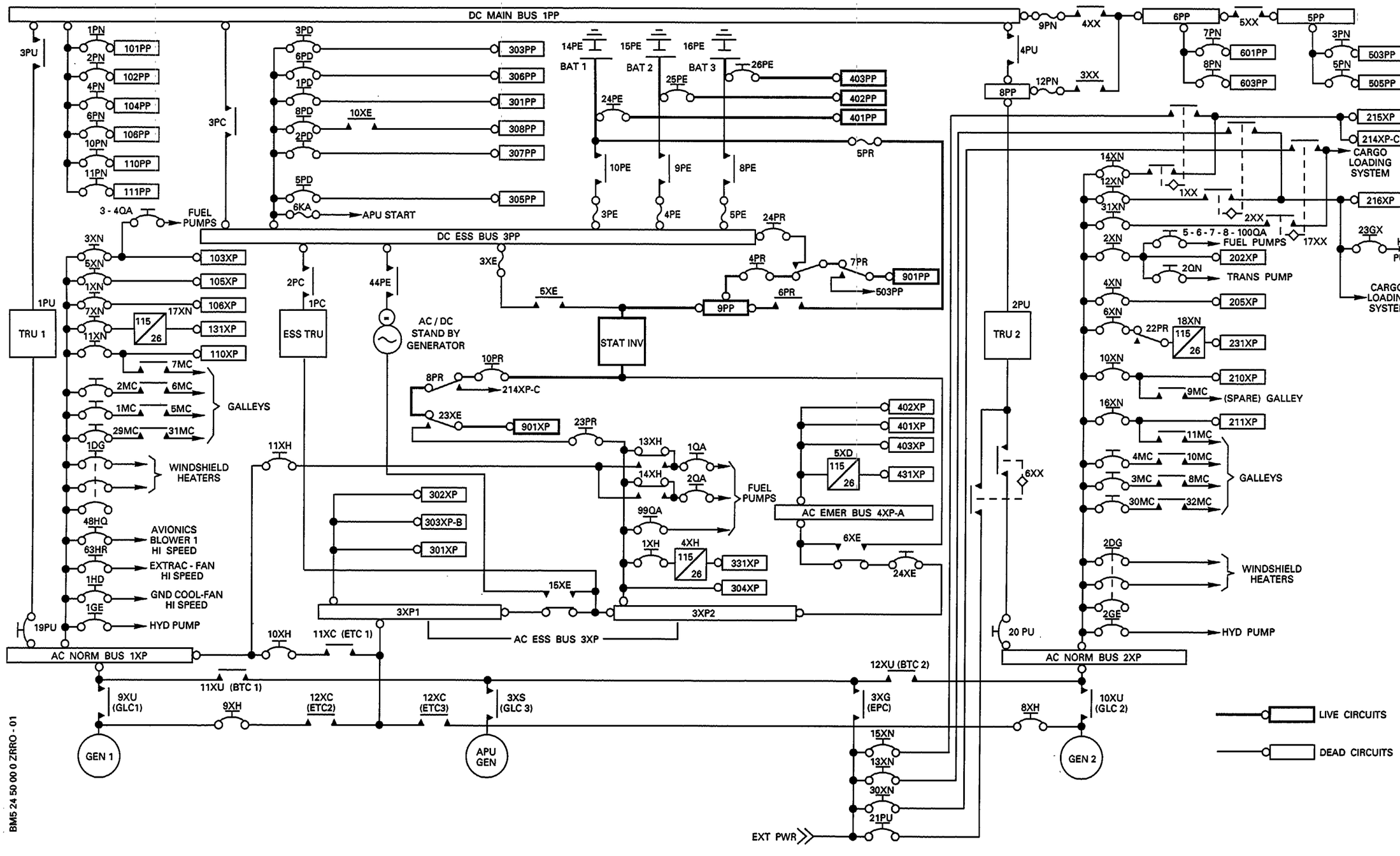


Electrical Load Distribution - Ground Service Configuration
Figure 028

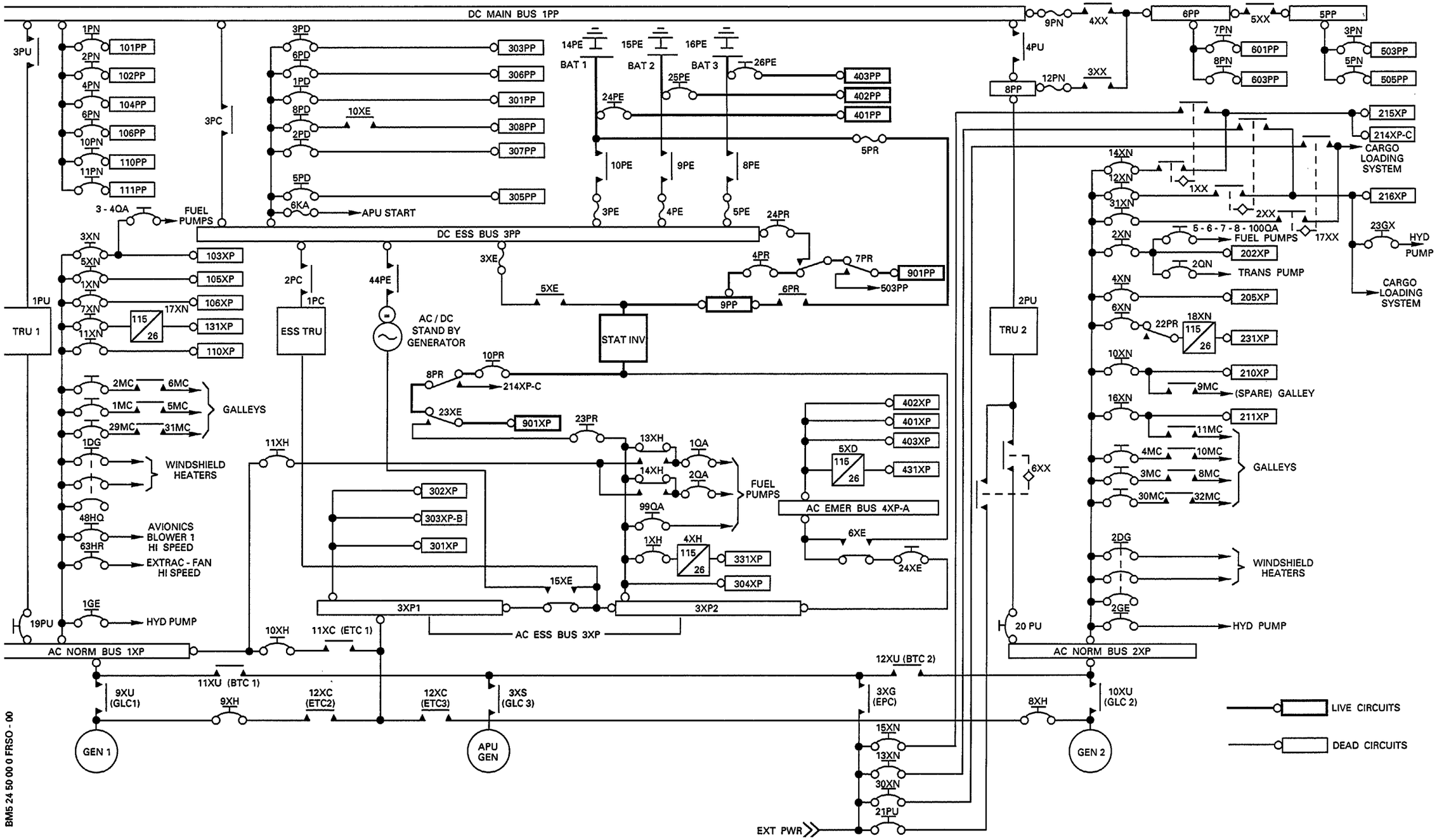


BM5 24 50 00 0 GRMO - 17

Electrical Load Distribution - Fueling on Battery Configuration
Figure 029



Electrical Load Distribution - Fueling on Battery Configuration
Figure 030



BM5 24 50 00 0 FRSO - 00

Electrical Load Distribution - Fueling on Battery Configuration
Figure 031

R

EFFECTIVITY: 101-200,

PIA

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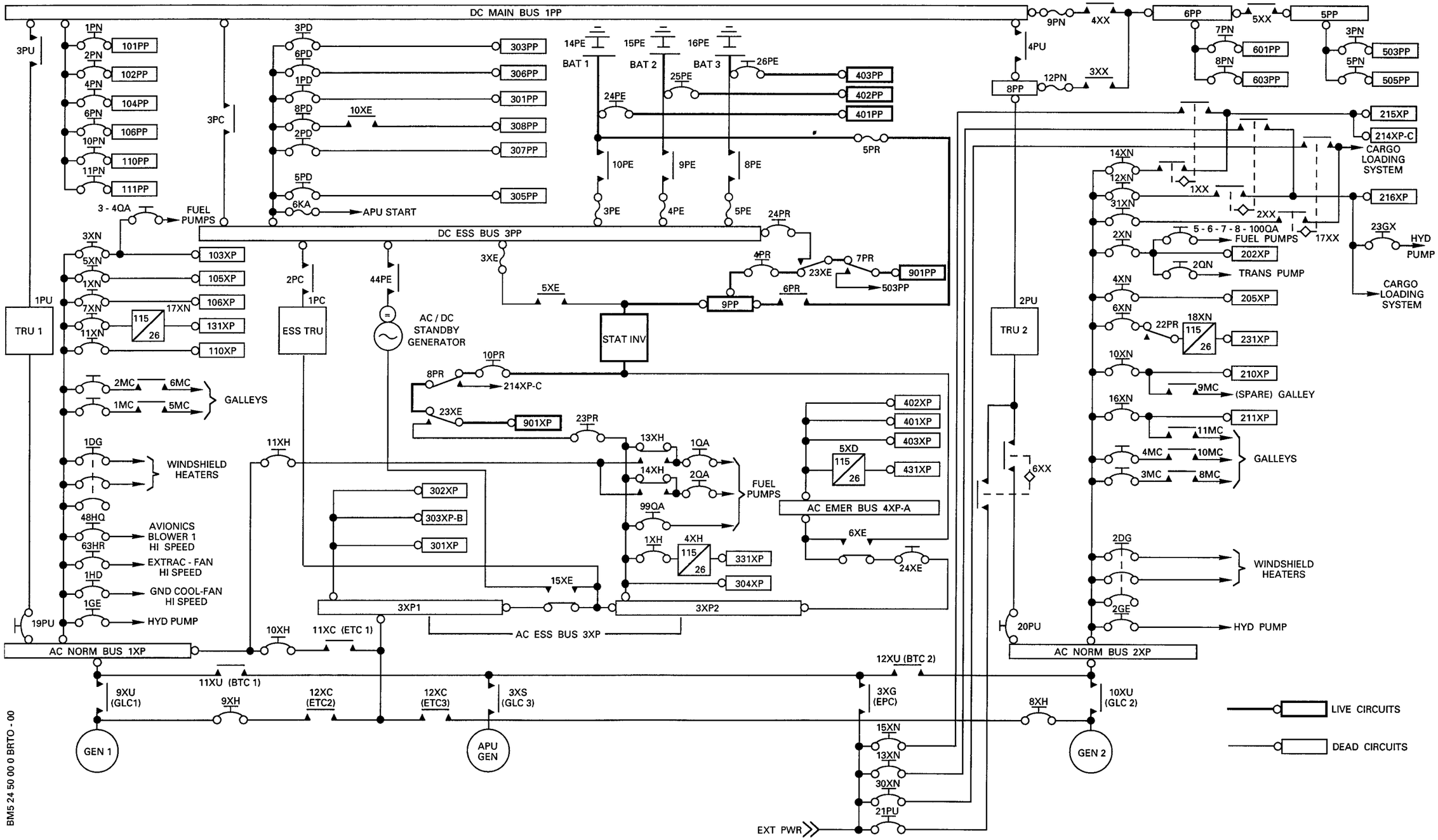

Electrical Load Distribution - Fueling on Battery
Configuration
Figure 032

1. Operational Test of Smoke Emergency Procedure

A. Reason for the Job
- To check AC and DC normal network supply cut-off through OVRD SUPPLY 1 & 2 pushbutton switches.
- To test LAND RECOVERY function.

R NOTE : Test of land recovery function can be performed with APU
R (Ref. 49-00-00, P. Block 501) or with EXT PWR (Ref. 24-41-00,
R P. Block 301).

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 31-51-00, P. Block 1	ECAM System
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 71-00-00, P. Block 501	Power Plant - General

C. Procedure

(1)Job set-up

(a)Start up both engines (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Start up ECAM (Ref. 31-51-00, P. Block 1).

(c)On ELEC IND panel 425VU
- place AC selector switch in BUS ESS position.

NOTE : On panel 424VU, make certain that APU GEN and EXT PWR pushbutton switches are released (out).

(2)Test of OVRD SUPPLY 1 & 2 function

ACTION	RESULT
1. On panel 424VU - Open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on. On panel 425VU - no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- Open the safety guard and press and release OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch go off. On panel 425VU - no change On R ECAM display unit - check that display corresponds to

ACTION	RESULT
	indications on panels 424VU and 425VU.
- Open the safety guard and press OVRD SUPPLY 2 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on On panel 425VU - no change On R ECAM display unit - check that display corresponds to indications on panels 424VU and 425VU.
- Open the safety guard and press OVRD SUPPLY 1 pushbutton switch.	On panel 424VU - ON legend and flowbar of this pushbutton switch come on. - On OVRD SUPPLY 2 pushbutton switch, flowbar goes off and ON legend remains on. - AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights come on. On panel 425VU - no change On R ECAM display unit - No display
- press and release GEN 1 pushbutton switch.	On panel 424VU - OFF legend of this light comes on. - OVRD SUPPLY 2 pushbutton switch flowbar comes on, OVDR SUPPLY 1 pushbutton switch flowbar goes off. - ON legends of these lights remain on. - AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights remain on. On panel 425VU - no change On R ECAM display unit - No display
- press GEN 1 pushbutton switch, open the safety guards and press and release OVRD SUPPLY 1 and 2 push-button switches.	On panel 424VU - all lights go off On panel 425VU - no change On R ECAM display unit

ACTION	RESULT
	- check that display corresponds to indications on panels 424VU and 425VU.

R **ON A/C ALL

R Post SB 24-2041 For A/C 001-003,

(3)Test of the fuel pump power supply with the OVRD SUPPLY 1 & 2 function

ACTION	RESULT
(1) On panel 101VU - Open circuit breaker 11XH.	On overhead fuel panel 430VU - On L INR TK PUMP 2 and R INR TK PUMP 1 pushbutton switches, FAULT legends are on.
(2) On panel 101VU - Open circuit breaker 10XH.	On ECAM display unit - L INR PUMP 2 and R INR PUMP 1 messages indicate pump relays energized (Green & in line).
On panel 424VU - Press OVRD SUPPLY 1 pushbutton switch.	
(3) On panel 101VU - Open circuit breaker 2QA.	On overhead fuel panel 430VU - On R INR TK PUMP 1 pushbutton switch, FAULT legend must be on. (On ECAM display unit, R INR TK PUMP 1 message may be amber and LO may appear).
(4) Release OVRD SUPPLY 1 and press OVRD SUPPLY 2 pushbutton switch.	Same results as in (2) and (3), i.e. ECAM display unit indicates both pumps are on (however R INR TK PUMP 1 message may be amber and LO may appear), but on 430VU FAULT legend on R INR TK PUMP 1 pushbutton switch is on.
(5) Release OVRD SUPPLY 2 pushbutton switch, close circuit breakers 2QA, 10XH, 11XH.	
(6) Press OVRD SUPPLY 1 and OVRD SUPPLY 2 pushbutton	On overhead panel FUEL QTY, the quantity indication for

ACTION	RESULT
switches.	center tank (CTR/TT), OUTR and INR must be available.
(7) Open circuit breaker 2QA.	On overhead fuel panel 430VU - On R INR TK PUMP 1 pushbutton switch, FAULT legend must be off.
(8) Release L INR TK PUMP 2 pushbutton switch.	On R INR PUMP 1 pushbutton switch, FAULT legend is on.
(9) Press pushbutton switch L INR TK PUMP 2, close circuit breaker 2QA, press OFF OVRD SUPPLY 1 and OVRD SUPPLY 2 pushbutton switches.	On ECAM display unit - All fuel pumps are running.
	On overhead fuel panel 430VU - FAULT legends must be off.

**ON A/C 001-003,

(3)Not applicable.

**ON A/C ALL

R (4)Operational test of LAND RECOVERY configuration.
(a)Shut down both engines (Ref. 71-00-00, P. Block 501).
(b)Start up APU (Ref. 49-00-00, P. Block 501) or connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)Test of anti skid system.
1 Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	BRAKES SYSTEM/CTL UNIT/NORM	2GG	332/U55
133VU	BRAKES SYSTEM/CTL UNIT/NORM	4GG	331/V55
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	41GG	332/U56
133VU	BRAKES SYSTEM/CTL UNIT/SUPPLY	42GG	331/V56

2 Test

ACTION	RESULT
On panel 424VU - press LAND RECOVERY pushbutton	On panel 424VU - on LAND RECOVERY pushbutton switch

ACTION	RESULT
switch 18XC.	ON legend comes on
On maintenance panel 472VU - place ANN LT switch IN READ position (memory read)	
On panel 11VU, on ECAM control panel - press WHEEL pushbutton switch.	On panel 4VU, on right ECAM display unit - check that WHEEL page is displayed
On ANTI SKID section of maintenance panel 471VU - press PUSH TO TEST/OK pushbutton switch for more than 10 seconds.	On panel 471VU - OK legend comes on and goes off after 10 s. On panel 4VU, on right ECAM display unit - 8 brake release symbols appear then disappear after 10 s.

NOTE : A protective circuit interrupts the test after 10 seconds in the event of OK pushbutton switch failure (jamming of push-button switch in pressed position).
If OK pushbutton switch is released before the 10 seconds have elapsed, the OK legend goes off and 8 brake release symbols disappear as soon as pushbutton switch is released.

3 Close-up
- Remove safety clips and tags and close circuit breakers previously opened.
- Press and release LAND RECOVERY pushbutton switch 18XC.

(d)Test of slats and flaps

ACTION	RESULT
- On panel 133VU, 335/R61 open circuit breaker 1CV and 332/U61, open circuit breaker 5CV	ON overhead panel - FAULT legend of FLAPS/SYS1 light comes on
- On panel 424VU, press LAND RECOVERY pushbutton switch 18XC.	- FAULT legend of FLAPS/SYS1 light goes off.
- On panel 133VU, 335/R67, open circuit breaker 10CV	- FAULT legend of FLAPS/SYS1 light comes on
- On panel 133VU, 335/R67, close circuit breaker 10CV	- FAULT legend of FLAPS/SYS1 light goes off.
- On panel 133VU, 335/R65, open circuit breaker 3CV	- FAULT legends of SLATS/SYS1 and FLAPS/SYS1 lights come on.
- On panel 133VU, 335/R65, close	- FAULT legends of SLATS/SYS1

ACTION	RESULT
circuit breaker 3CV	and FLAPS/SYS1 lights go off.
- On panel 133VU, 335/R66, open circuit breaker 9CV	- FAULT legend of SLATS/SYS1 light comes on.
- On panel 133VU, 335/R66, close circuit breaker 9CV	- FAULT legend of SLATS/SYS1 light goes off.
- On panel 424VU, press and release LAND RECOVERY pushbutton switch 18XC.	- FAULT legend of FLAPS/SYS1 light comes on.
- On panel 133VU, close circuit breaker 1CV, 335/R61 and circut breaker 5CV, 332/U61.	- FAULT legend of FLAPS/SYS1 light goes off.

(e)Test of spoilers

1 Aircraft hydraulically powered using electric pumps and PTU and spoiler system engaged.

2 open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR 6,7	7CP	335/R62
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR 2,3	5CP	335/R63
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR 5	55CP	334/S64
133VU	EFCU TRANSDUCERS/NORM SUPPLY/SPLR 1,4	53CP	334/S63
133VU	EFCU/NORM SUPPLY/SPLR 6,7	10CP	332/U62
133VU	EFCU/NORM SUPPLY/SPLR 2,3	8CP	333/T62
133VU	EFCU/NORM SUPPLY/SPLR 5	70CP	333/T65
133VU	EFCU/NORM SUPPLY/SPLR 1,4	71CP	331/V62

NOTE : Disregard FAULT legends of SPLR & SPD BRK 2,3 and 5 lights during the following test.

3 Test

ACTION	RESULT
- On panel 424VU, press LAND RECOVERY pushbutton switch 18XC	On panel 428VU
- On panel 133VU, open circuit breaker 72CP, 333/T67	- FAULT legends of SPLR & SPD BRK 1 and 4 light come on.
- On panel 133VU, close circuit breaker 72CP, 333/T67	- FAULT legends of SPLR & SPD BRK 1 and 4 lights go off.
- On panel 133VU, open circuit breaker 9CP, 333/T66	- FAULT legends of SPLR & SPD BRK 6 and 7 lights come on.

ACTION	RESULT
- On panel 133VU, close circuit breaker 9CP, 333/T66	- FAULT legends of SPLR & SPD BRK 6 and 7 lights go off.
- On panel 133VU, open circuit breaker 54CP, 334/S67	- FAULT legends of SPLR & SPD BRK 1, 4, 6 and 7 lights come on.
- On panel 133VU, close circuit breaker 54CP, 334/S67	- FAULT legends of SPLR & SPD BRK 1, 4, 6 and 7 lights go off after resetting
- On panel 424VU, press and release LAND RECOVERY pushbutton switch 18XC.	

4 Remove safety clips and tags and close circuit breakers previously opened.
5 Disengage spoiler system : on overhead panel, all SPLR & SPD BRK pushbutton switches released (OFF legend on).
6 Depressurize hydraulic system.

R (5)Close-up
(a)Stop ECAM (Ref. 31-51-00, P. Block 1).
(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) and shut down APU (Ref. 49-00-00, P. Block 501).

CIRCUIT BREAKER PANEL 20VU - DESCRIPTION AND OPERATION

1. General

Overhead panel 20VU accessible to Captain and First Officer comprises circuit breaker panels 21VU and 22VU. The circuit breakers on the above panels are connected to both aircraft electrical generations :

- AC generation
- DC generation

Each circuit breaker is marked with the FIN (Functional Item Number) shown on the back of the VU panel.

2. Description

Only circuit breaker faces and electrical identifiers are shown in figures.

A. Circuit Breaker Panel 21VU

R **ON A/C 001-003,

(Ref. Fig. 001)

**ON A/C 101-200,

(Ref. Fig. 002)

**ON A/C 001-100,

Post SB 34-2058 For A/C 001-003,

(Ref. Fig. 003)

**ON A/C 101-200,

Post SB 72-2032 For A/C 101-200,

R

(Ref. Fig. 004)

**ON A/C ALL

B. Circuit Breaker Panel 22VU

**ON A/C 001-100,

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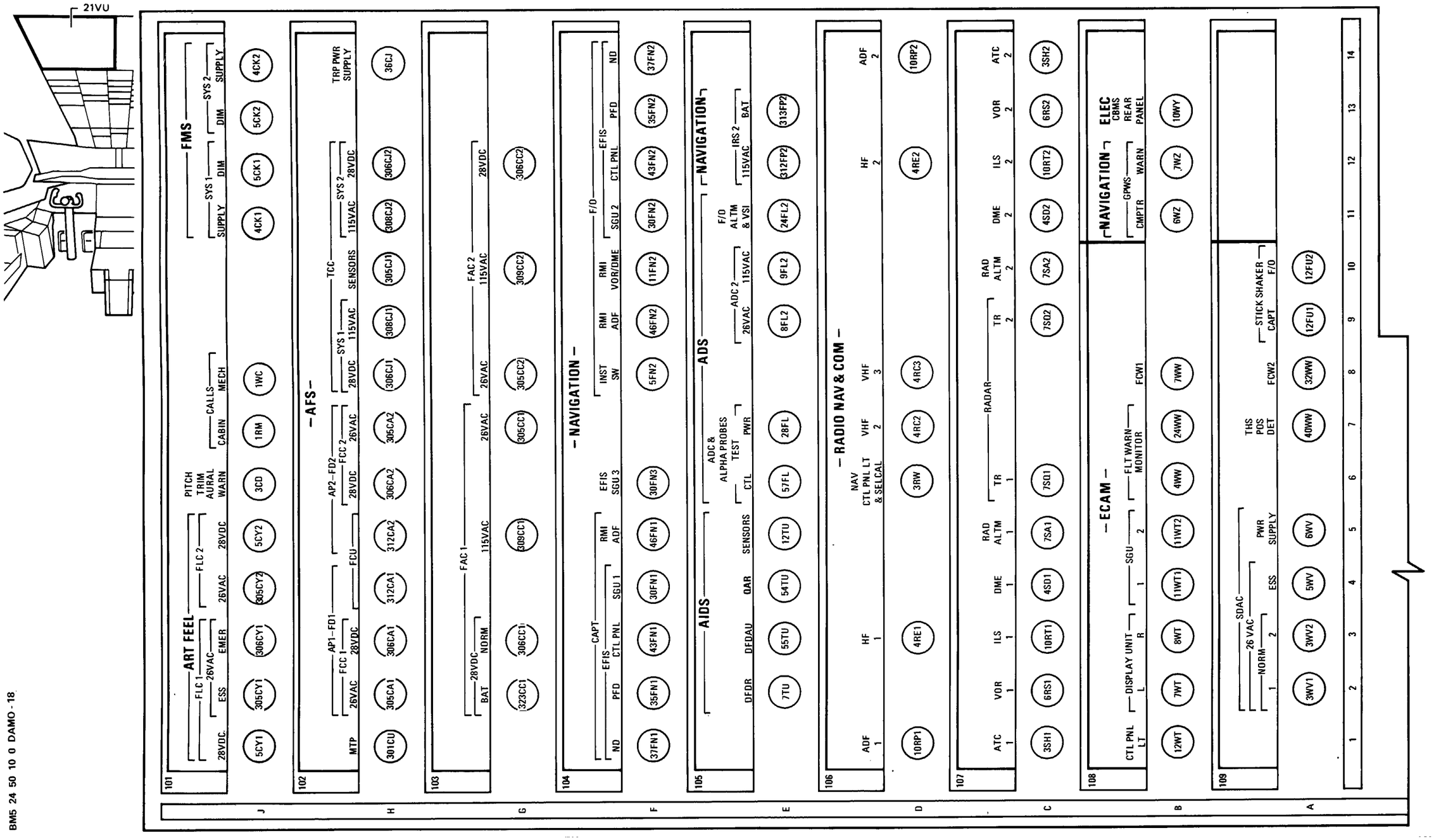
Printed in France



Distribution Panel 21VU
Figure 001

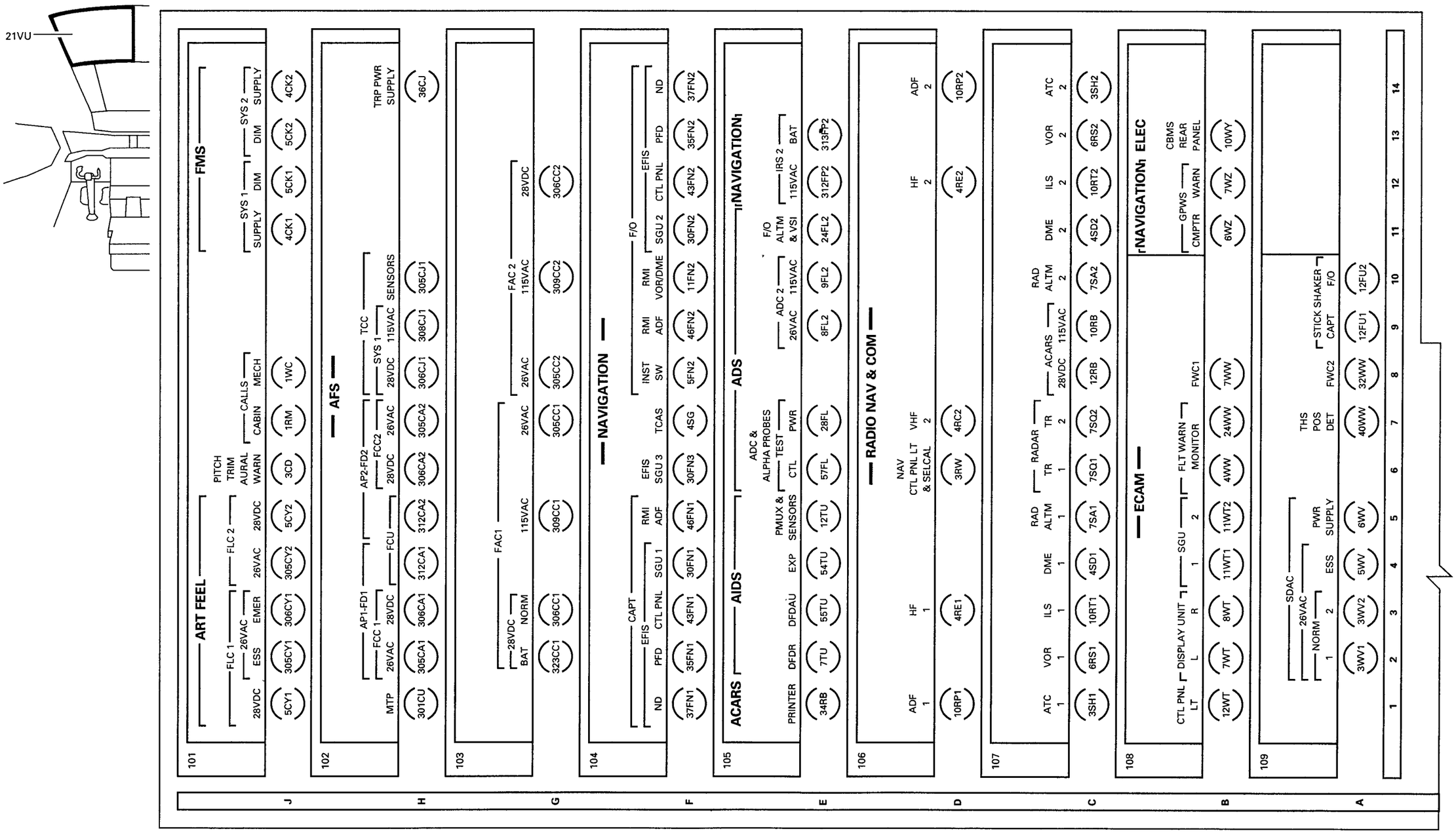
BM5 24 50 10 0 DAMO-18

EFFECTIVITY: 001-003,

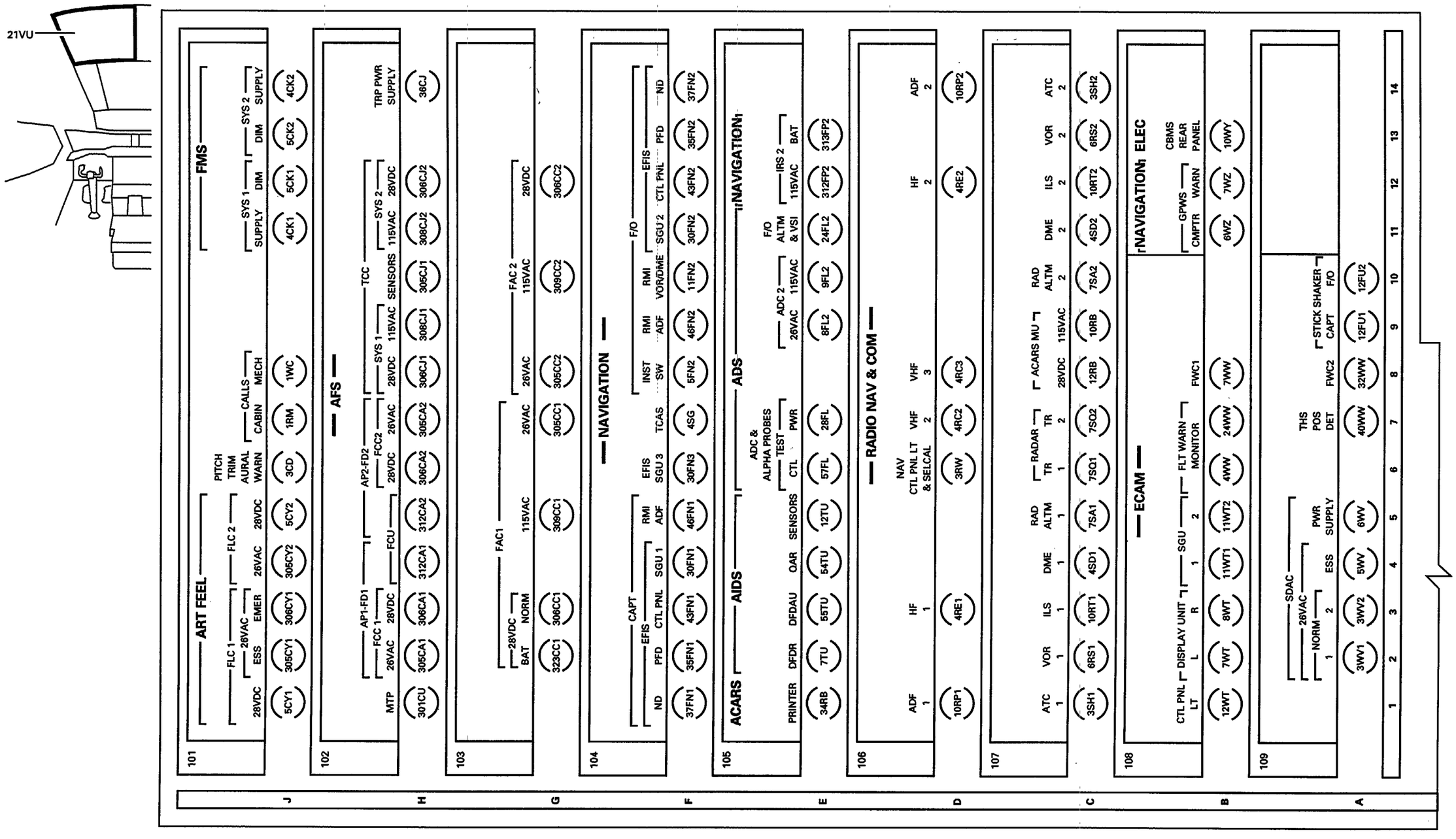
R

PIA

Printed in France



Distribution Panel 21VU
Figure 002



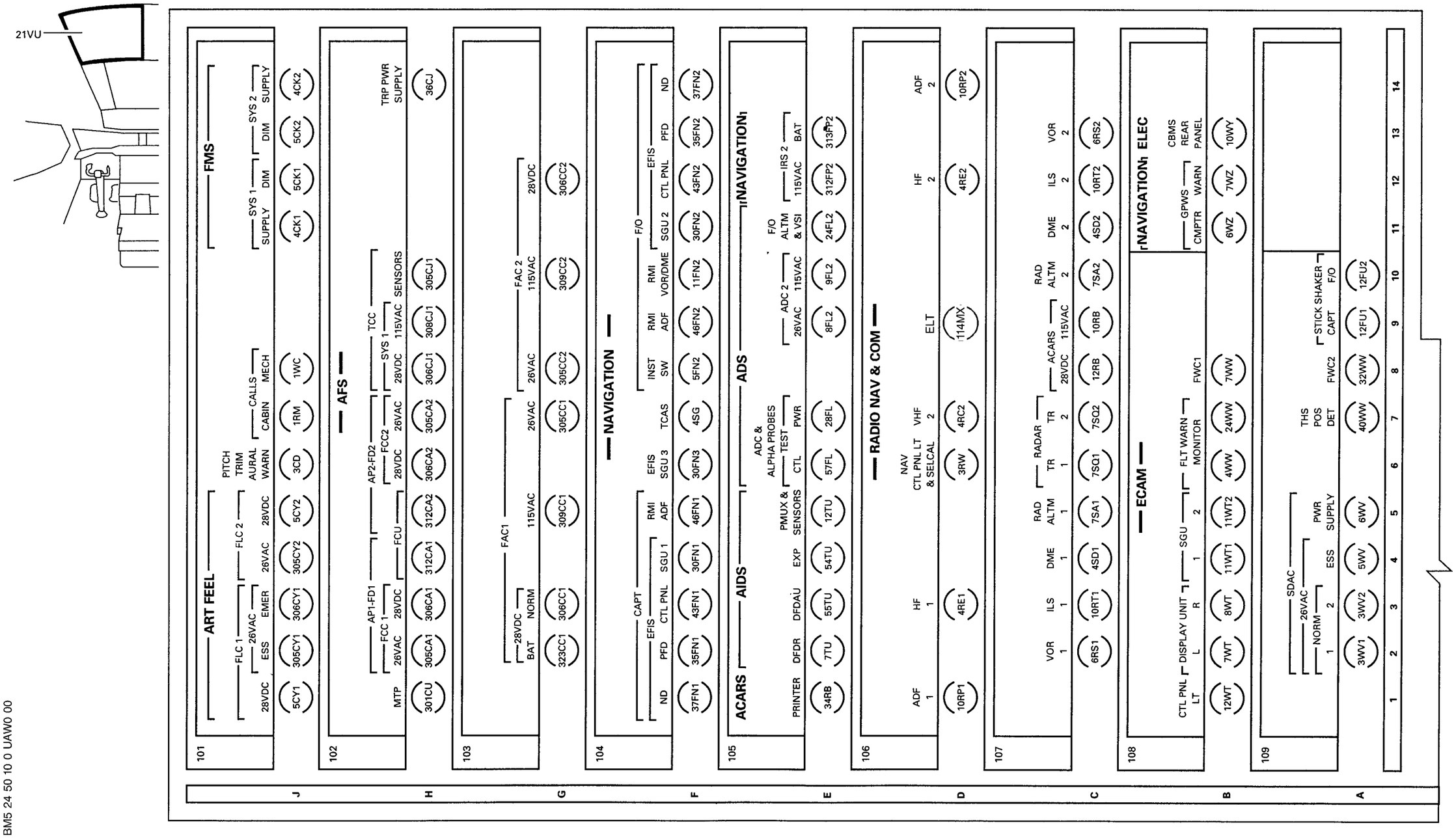
BM5 24 50 10 0 DBJO - 00

Distribution Panel 21VU
Figure 003

R EFFECTIVITY: 001-100,

PIA

Printed in France



Distribution Panel 21VU
Figure 004

(Ref. Fig. 005)

**ON A/C 101-200,

(Ref. Fig. 006)

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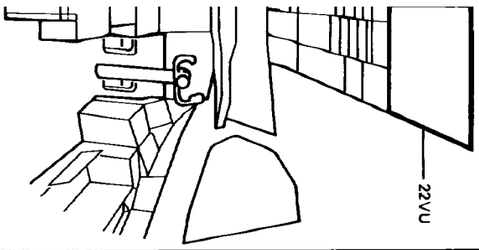
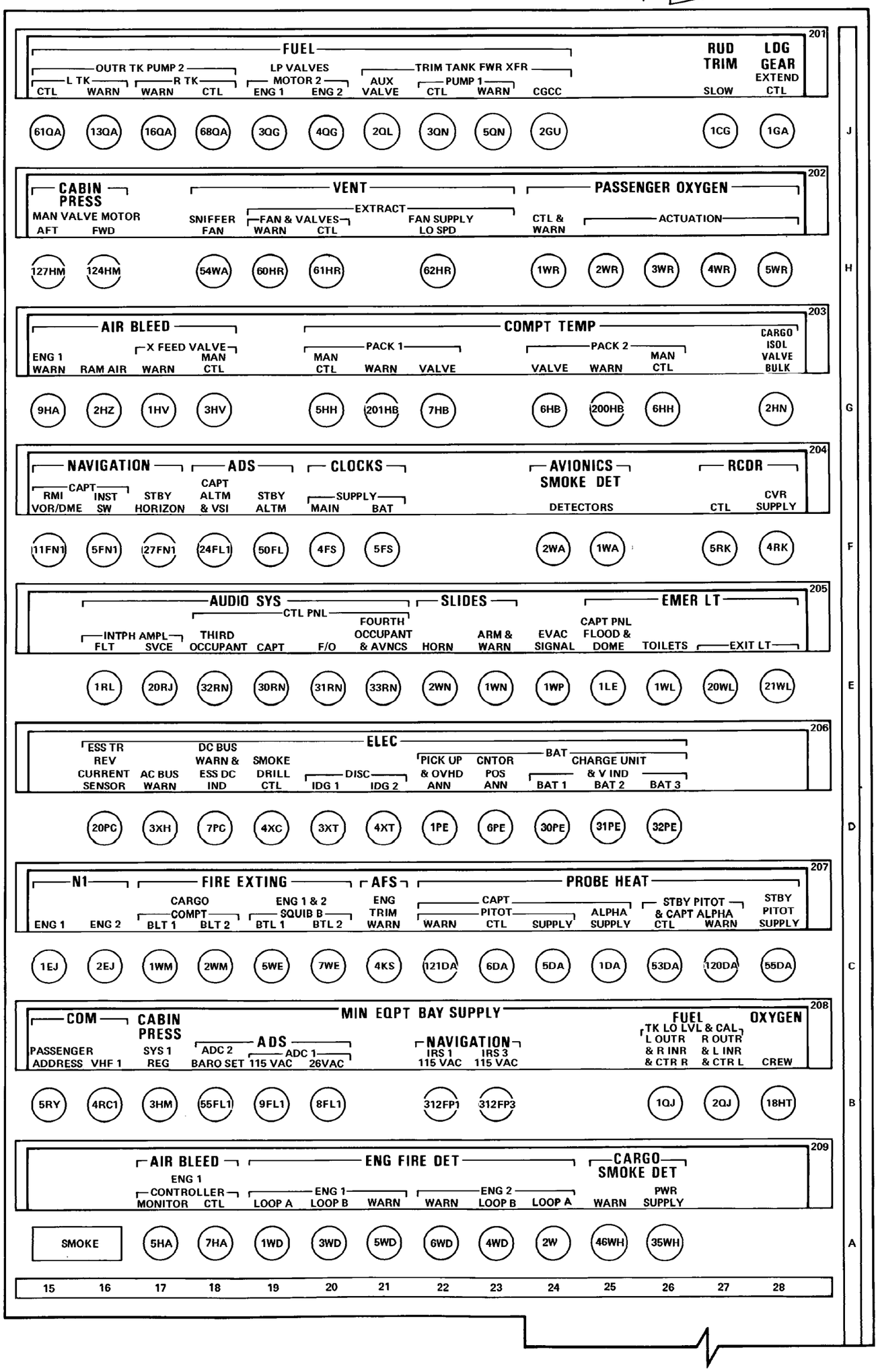
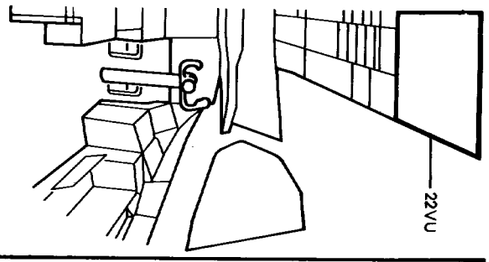
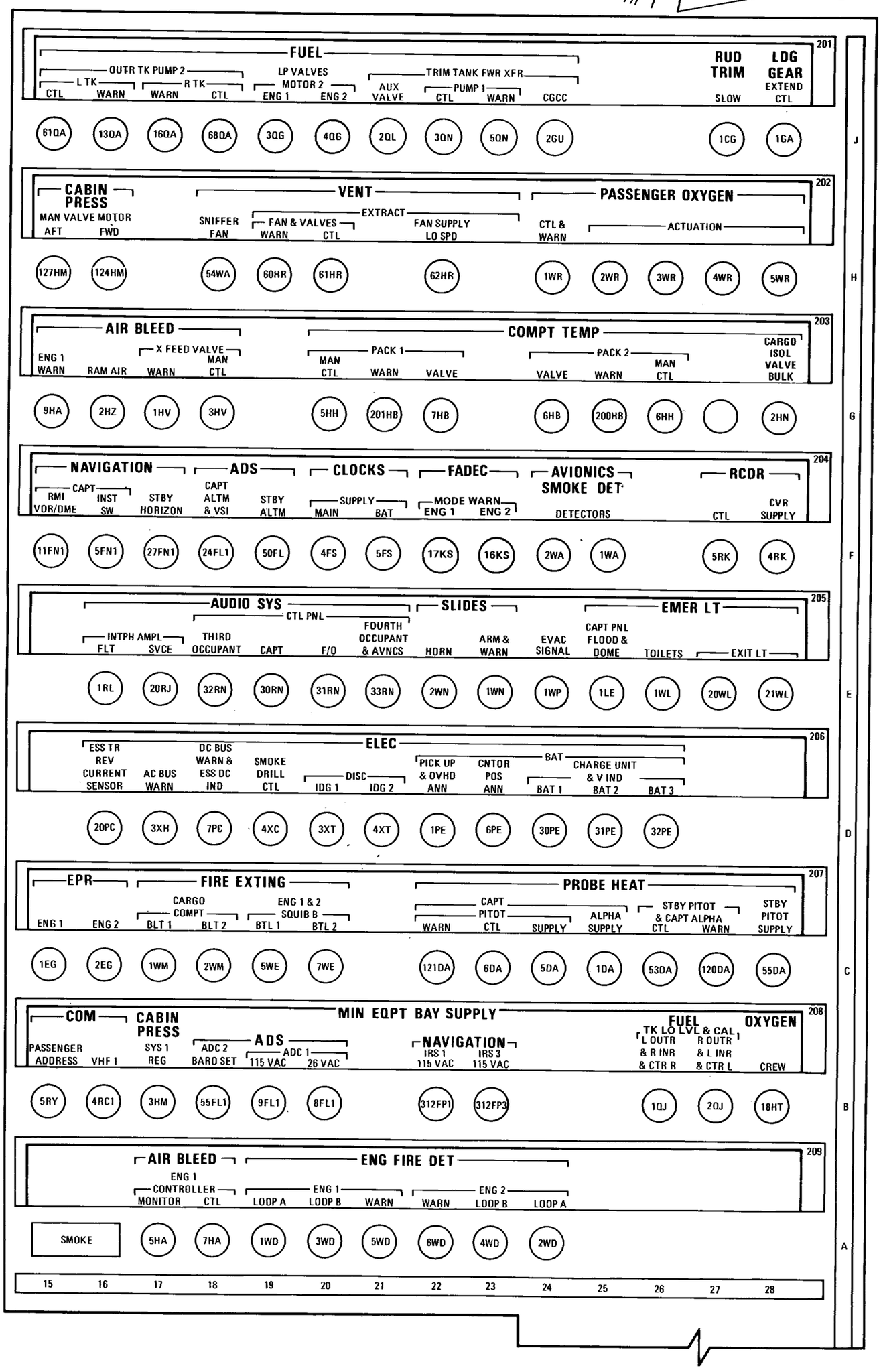


Distribution Panel 22VU
Figure 005





Distribution Panel 22VU
Figure 006



CIRCUIT BREAKER PANEL 120VU
DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)
   Rear panel 120VU, located near lateral panel comprises rear circuit breaker panels 131VU, 132VU and 133VU.
   The circuit breakers on the above panels are connected to both aircraft electrical generations
   - AC generation
   - DC generation

   Each circuit breaker is marked with the FIN (Functional Item Number) shown on the back of the VU panel.

2. Description
   Circuit breaker front faces and electrical identifiers are shown in figures.

   A. Circuit Breaker Panel 131VU

R **ON A/C 101-200,

(Ref. Fig. 002)

R **ON A/C 001-100,

(Ref. Fig. 003)

R **ON A/C ALL

   B. Circuit Breaker Panel 132VU
   - sheet 1 of the figure showns circuit breakers positioned between abscissa 51 and 63.
   - sheet 2 of the figure showns circuit breakers positioned between abscissa 64 and 85.

**ON A/C 001-003,

(Ref. Fig. 004)

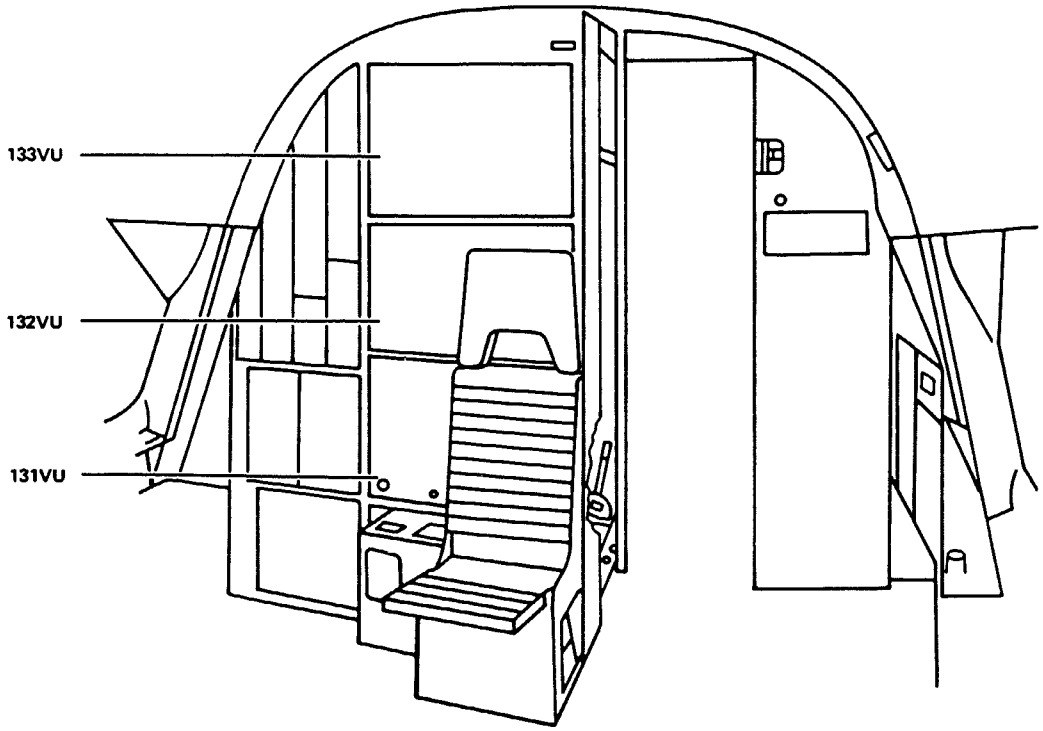
**ON A/C 001-003,

Post SB 28-2049 For A/C 001-003,

(Ref. Fig. 005)

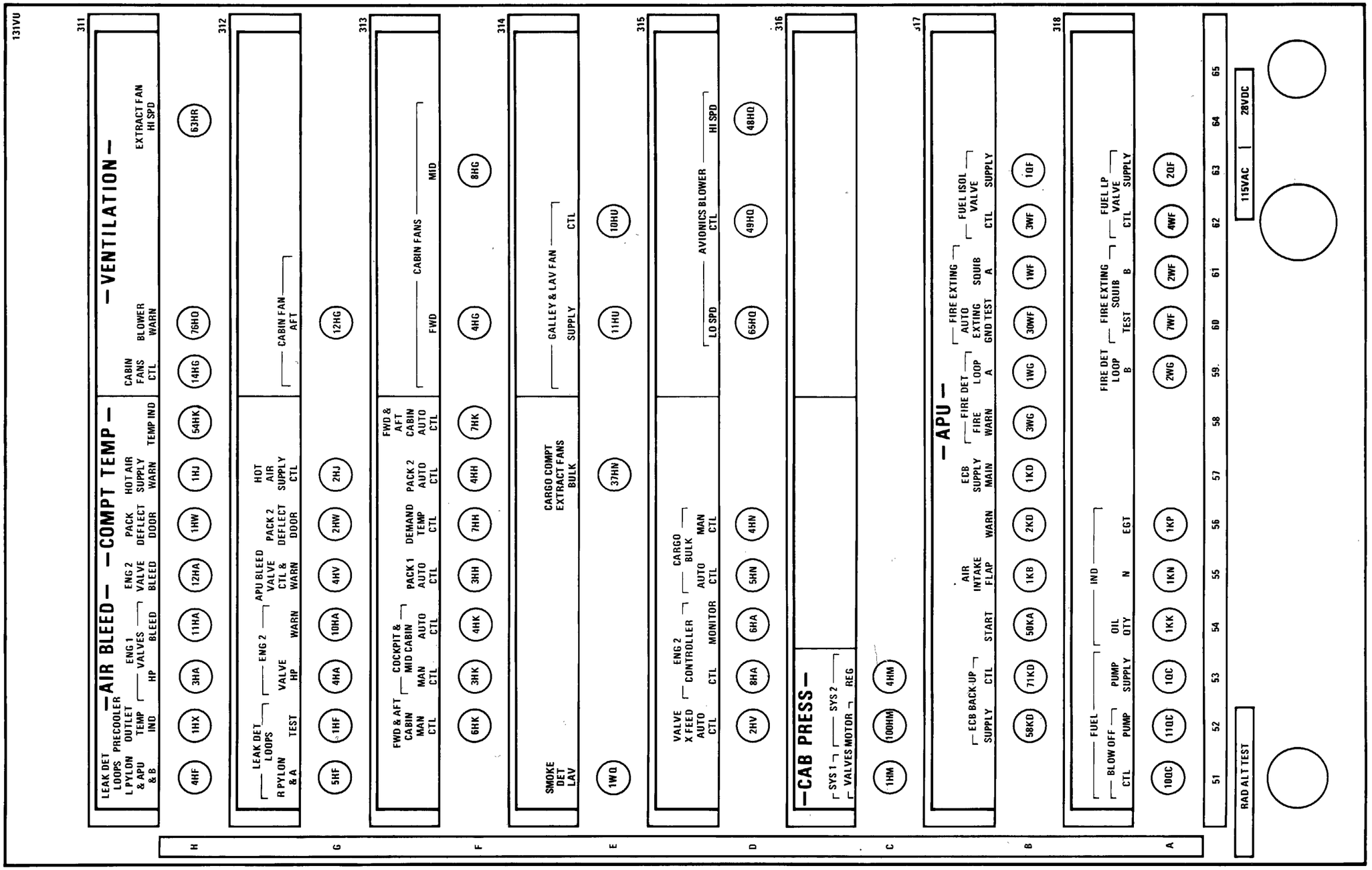
**ON A/C 004-100,

(Ref. Fig. 006)

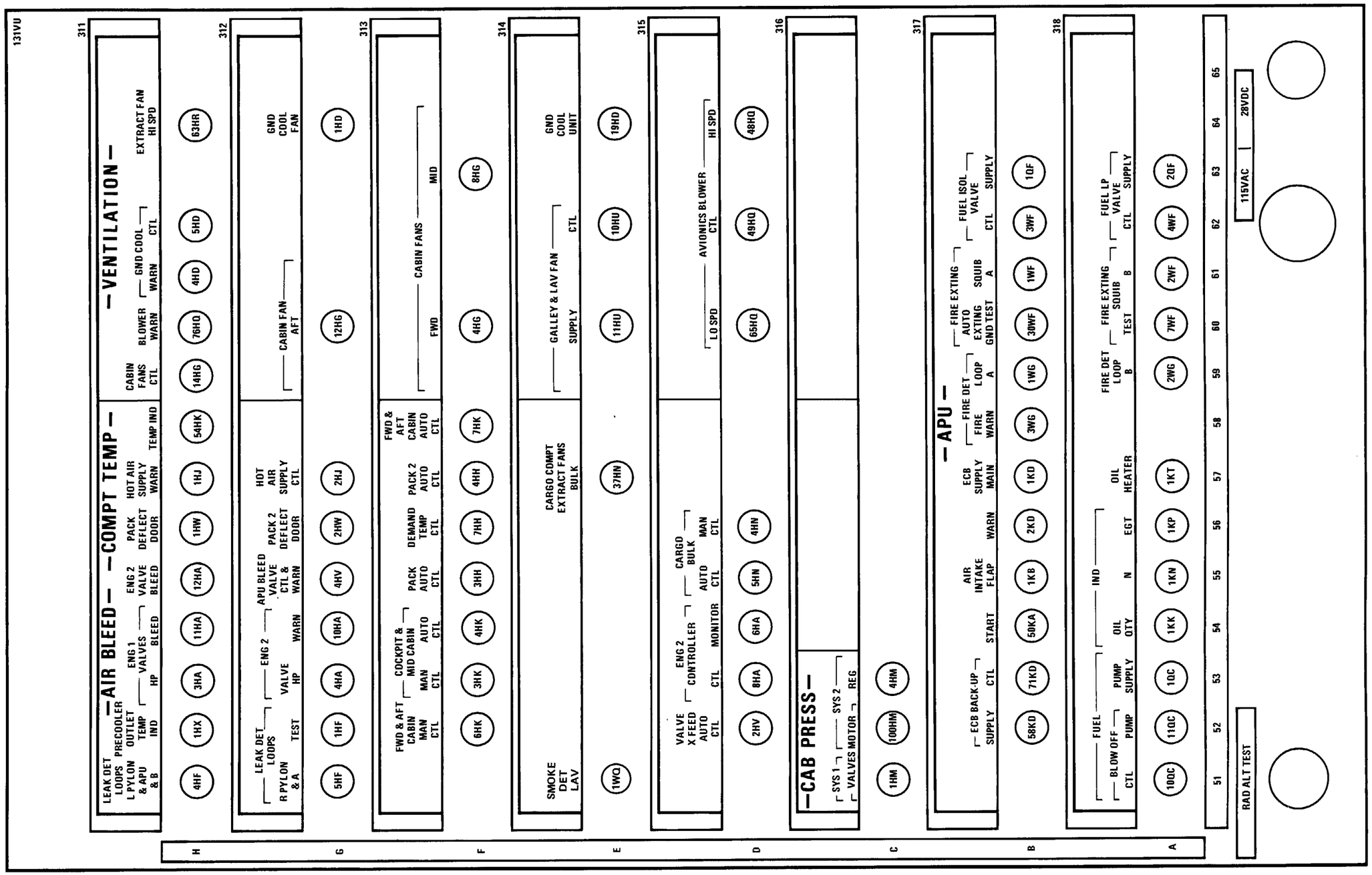


BM5 24 50 20 0 SAMO - 13

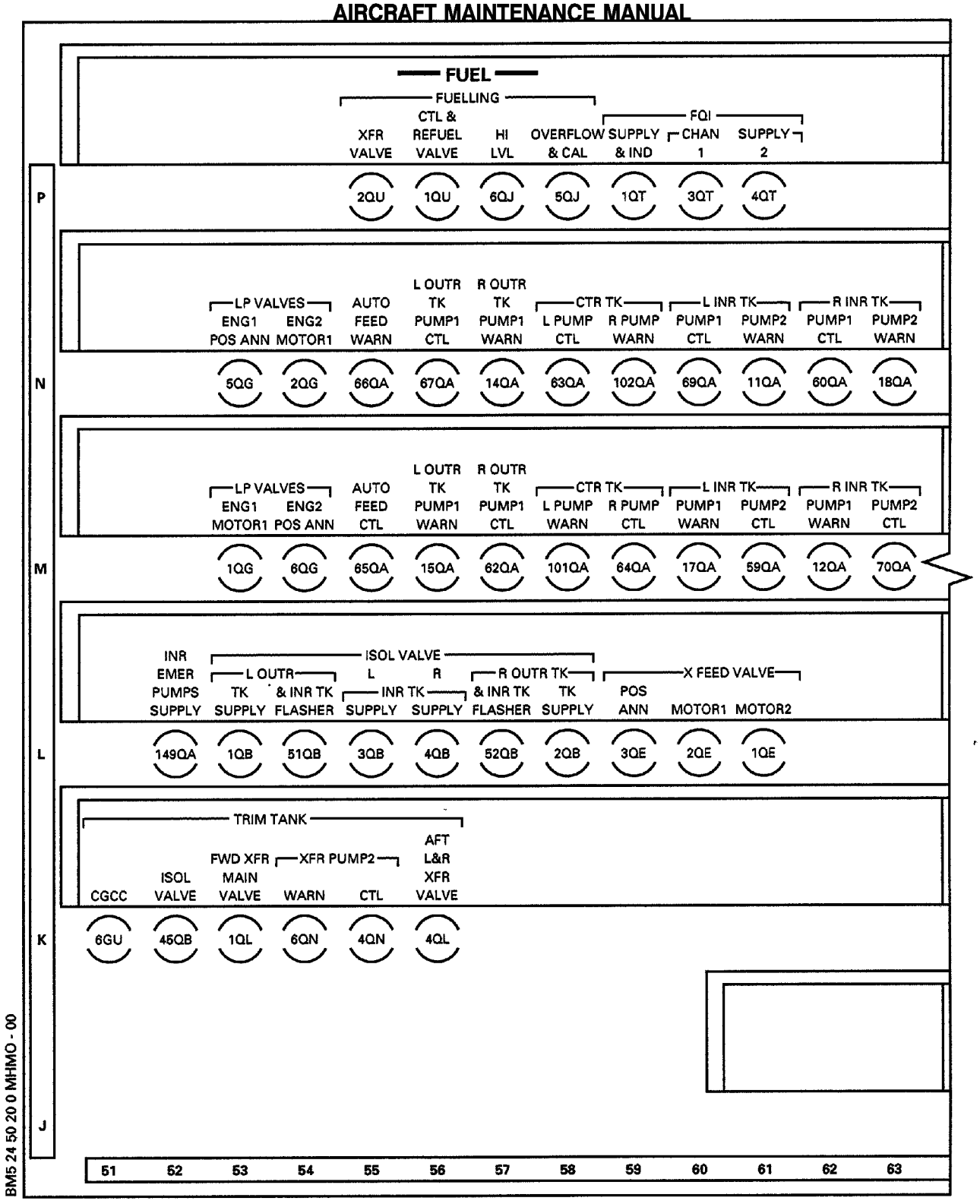
Location of Panels 131VU, 132VU and 133VU
Figure 001



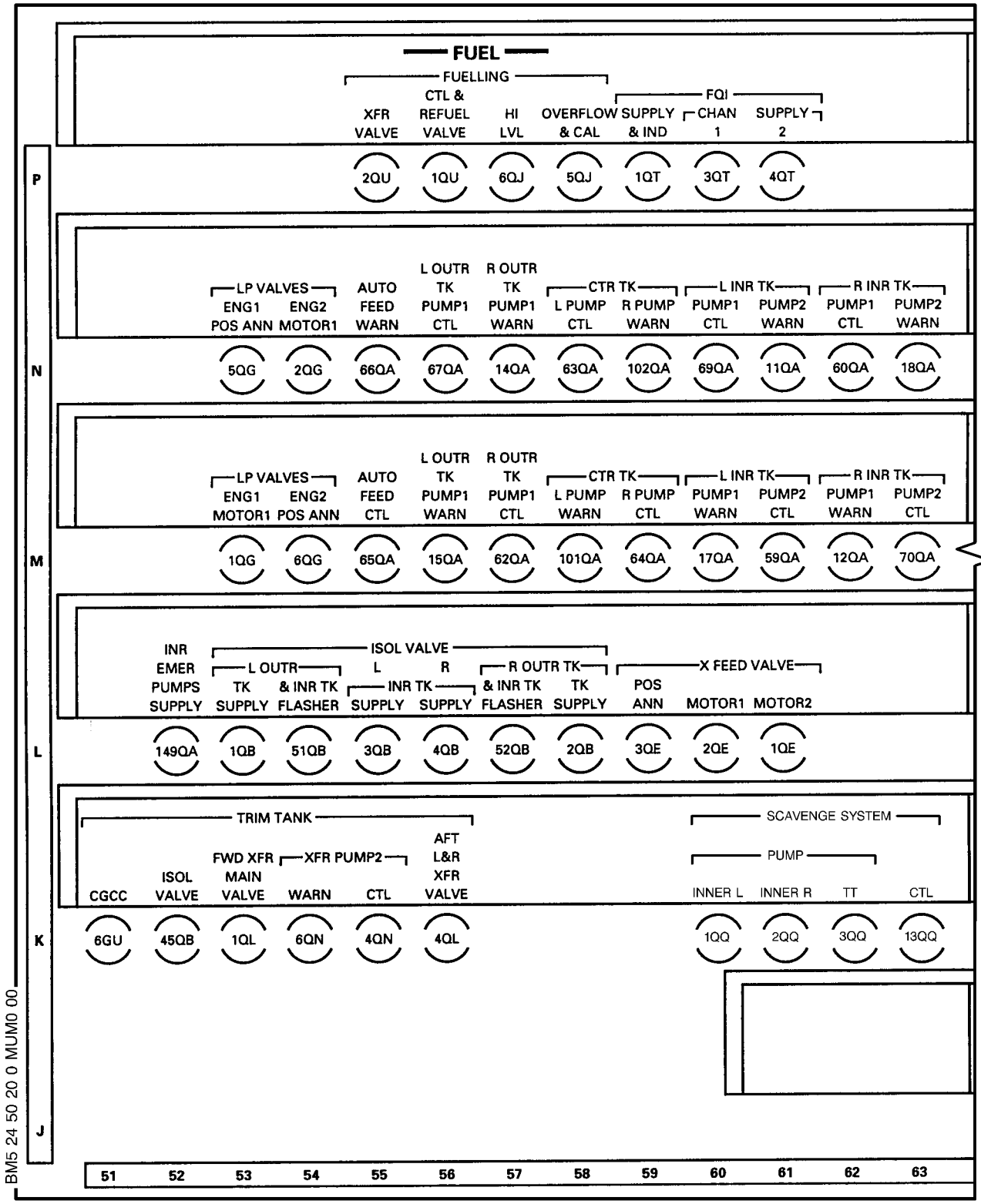
Distribution Panel 131VU
Figure 002



Distribution Panel 131VU
Figure 003



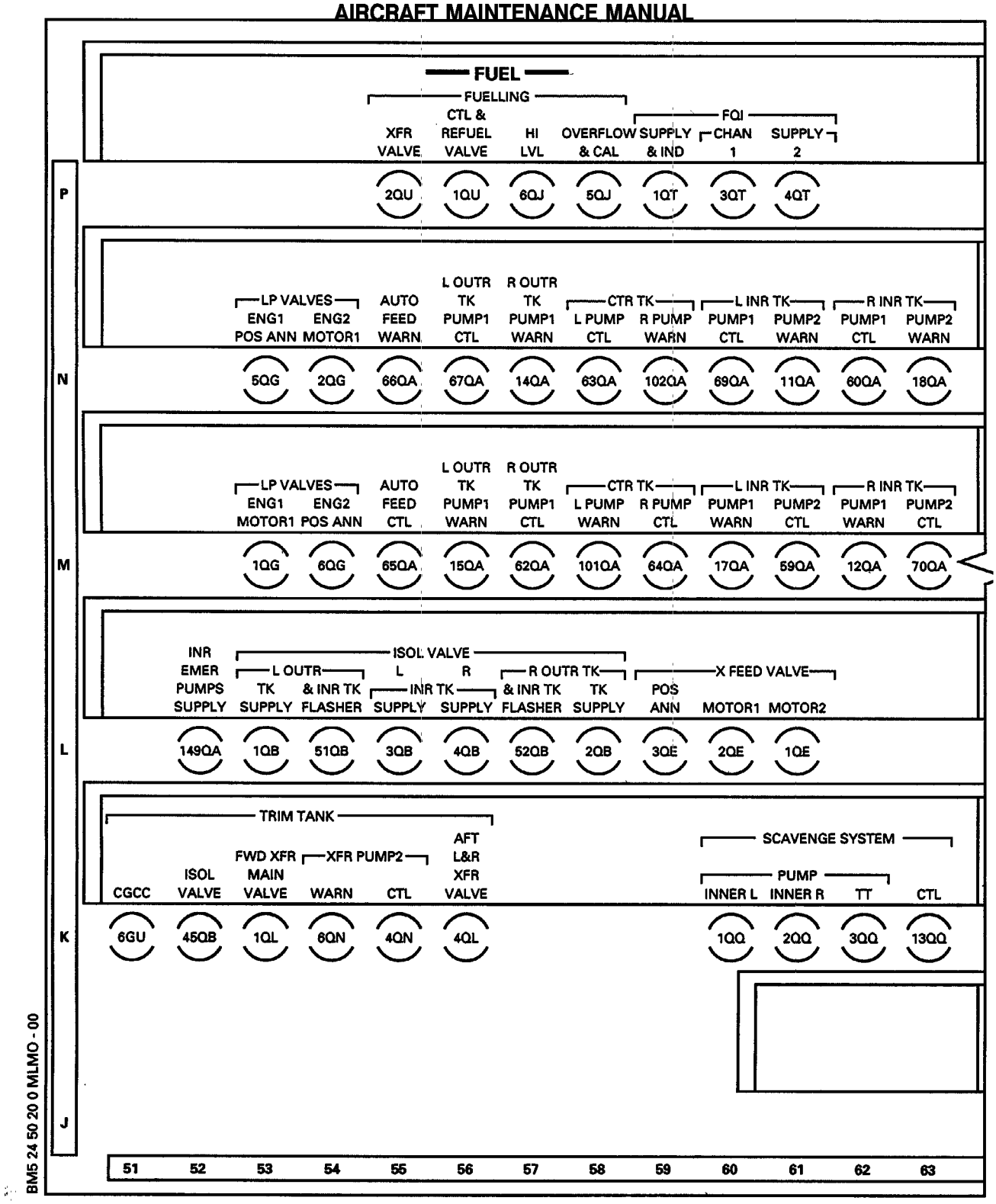
Distribution Panel 132VU - Sheet 1/2
Figure 004



Distribution Panel 132VU - Sheet 1/2
Figure 005

R EFFECTIVITY: 001-003,

PIA



Distribution Panel 132VU - Sheet 1/2
Figure 006

**ON A/C 101-200,

Post SB 28-2108 For A/C 101-200,

(Ref. Fig. 007)

**ON A/C 101-200,

(Ref. Fig. 008)
(Ref. Fig. 009)

**ON A/C 001-100,

(Ref. Fig. 010)

R **ON A/C 101-104,

R Post SB 33-2046 For A/C 101-104,

(Ref. Fig. 011)

R **ON A/C 105-200,

R Post SB 33-2046 For A/C 105-200,

R (Ref. Fig. 012)

**ON A/C ALL

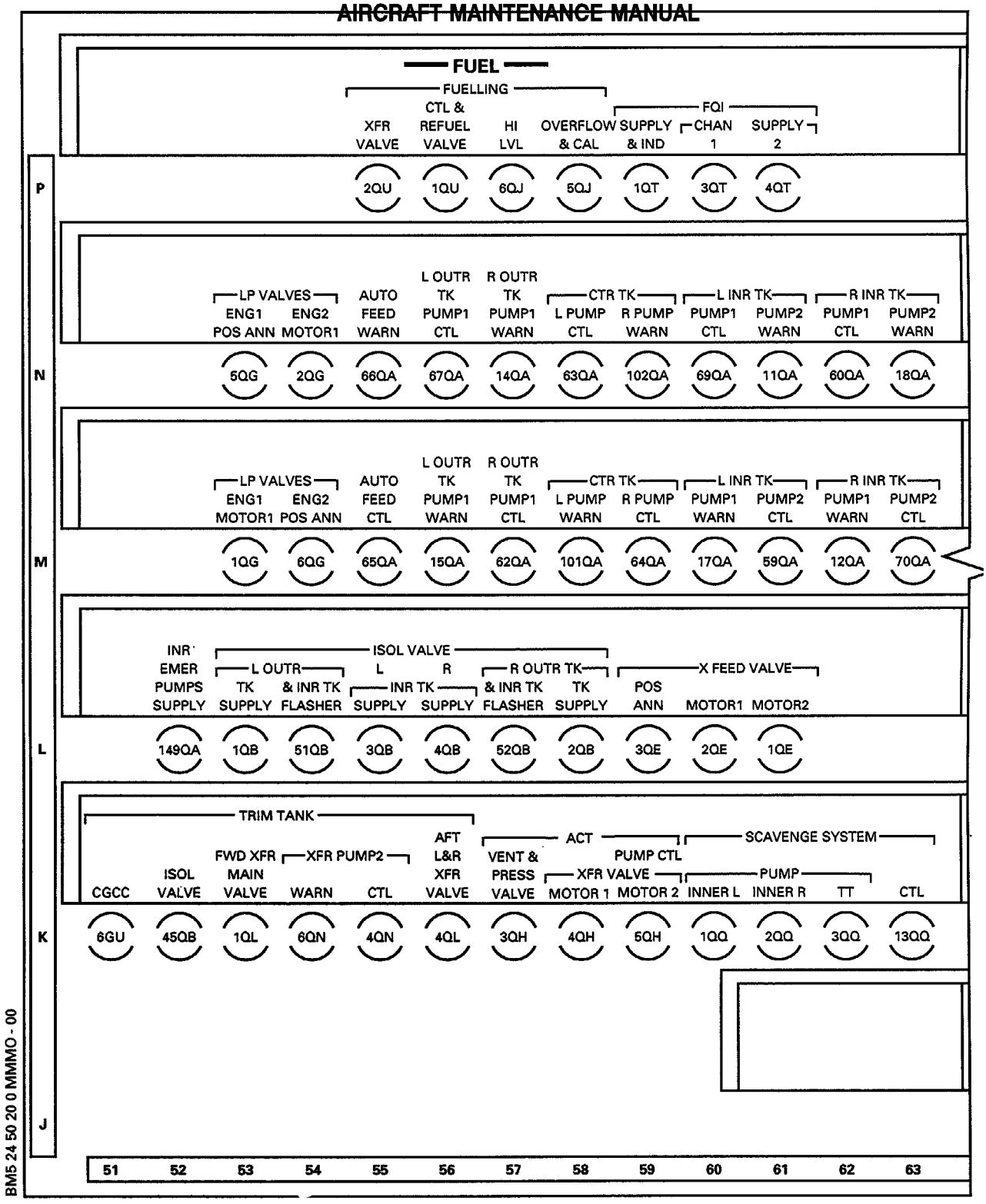
C. Circuit Breaker Panel 133VU
- sheet 1 of the figure showns circuit breakers positioned between abscissa 51 and 60.
- sheet 2 of the figure showns circuit breakers positioned between abscissa 61 and 85.

**ON A/C 101-200,

NOTE : Circuit breakers 1KU and 2KU are open, safetied and tagged.

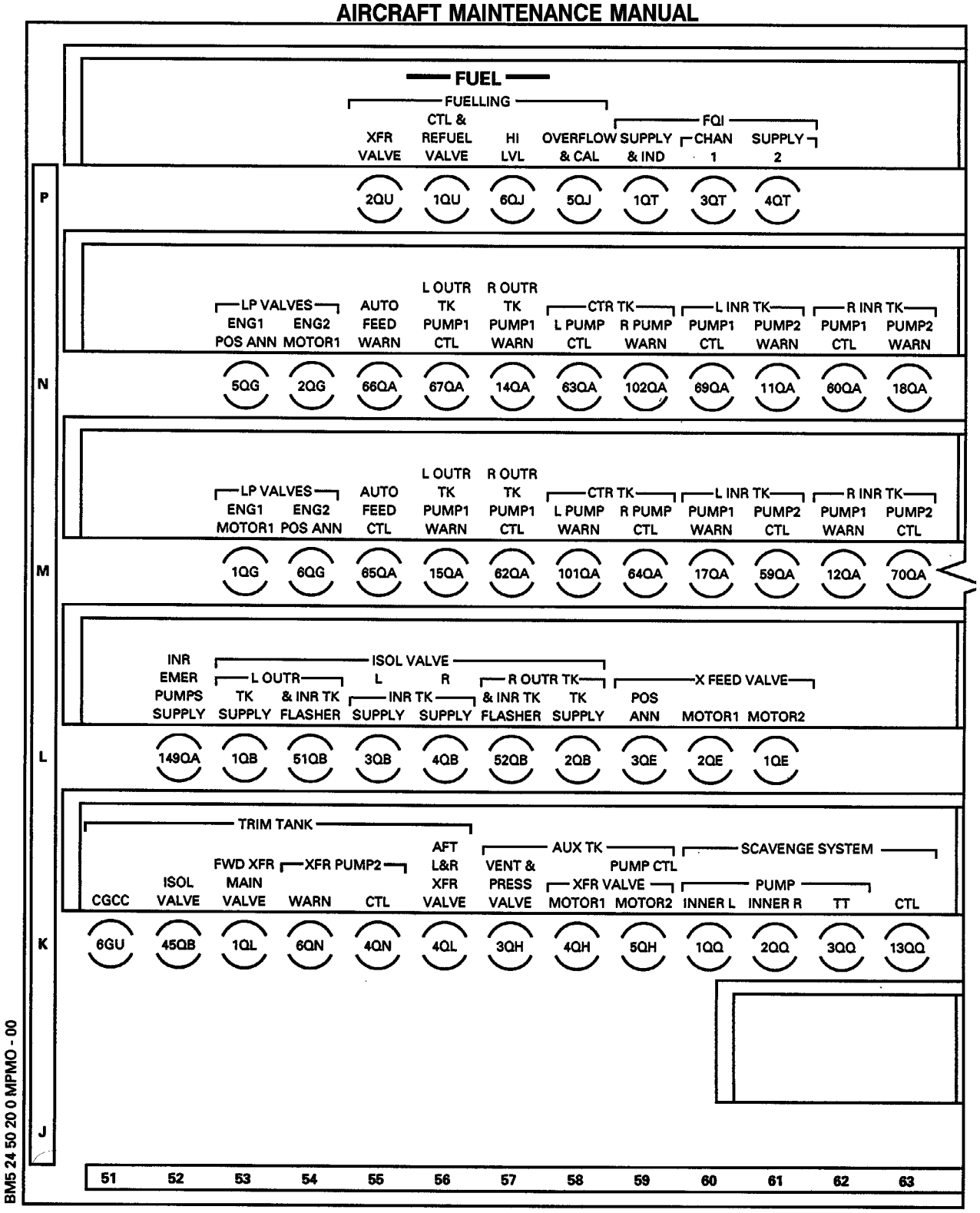
**ON A/C ALL

(Ref. Fig. 013)



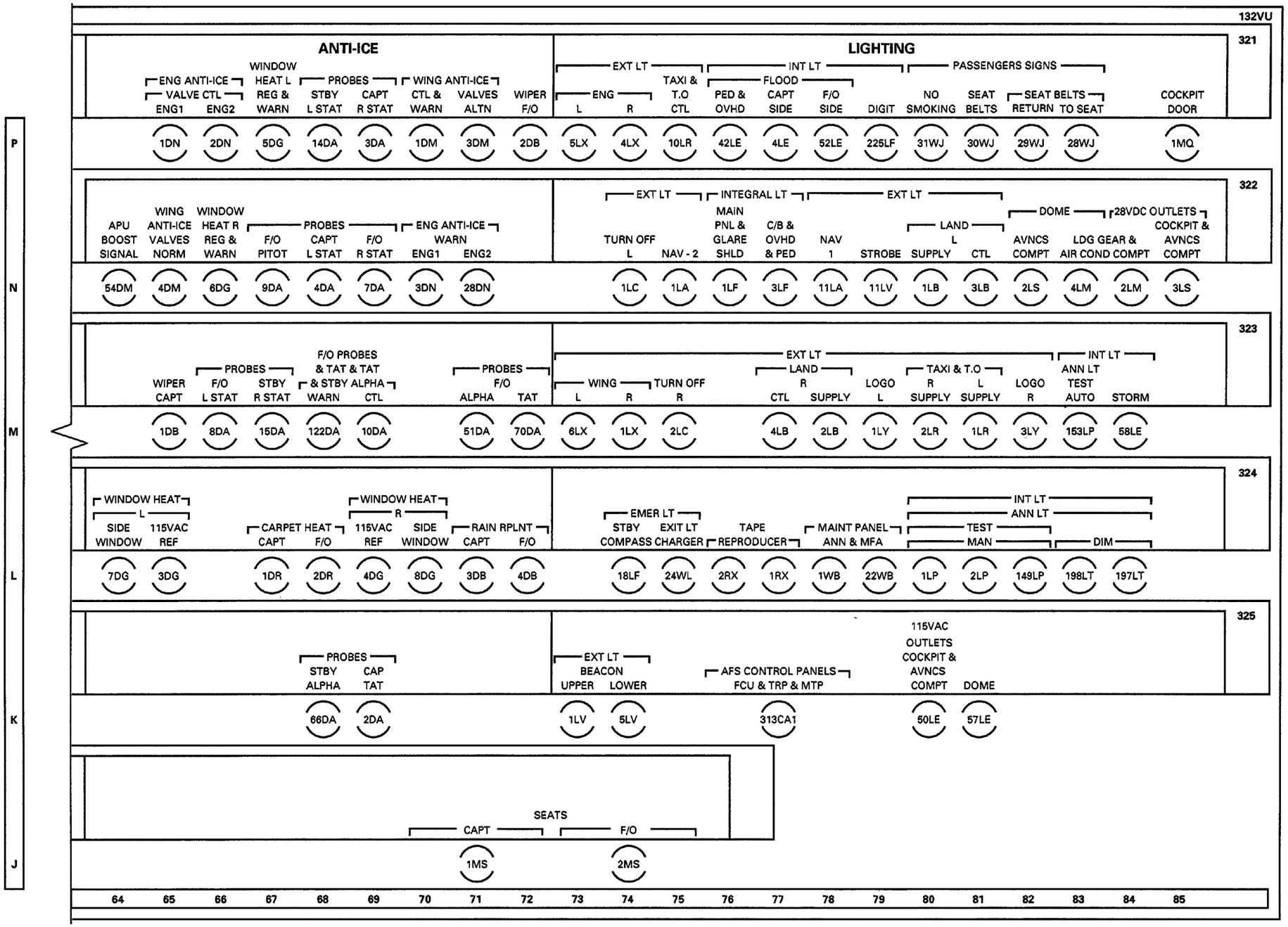
Distribution Panel 132VU - Sheet 1/2
Figure 007

R

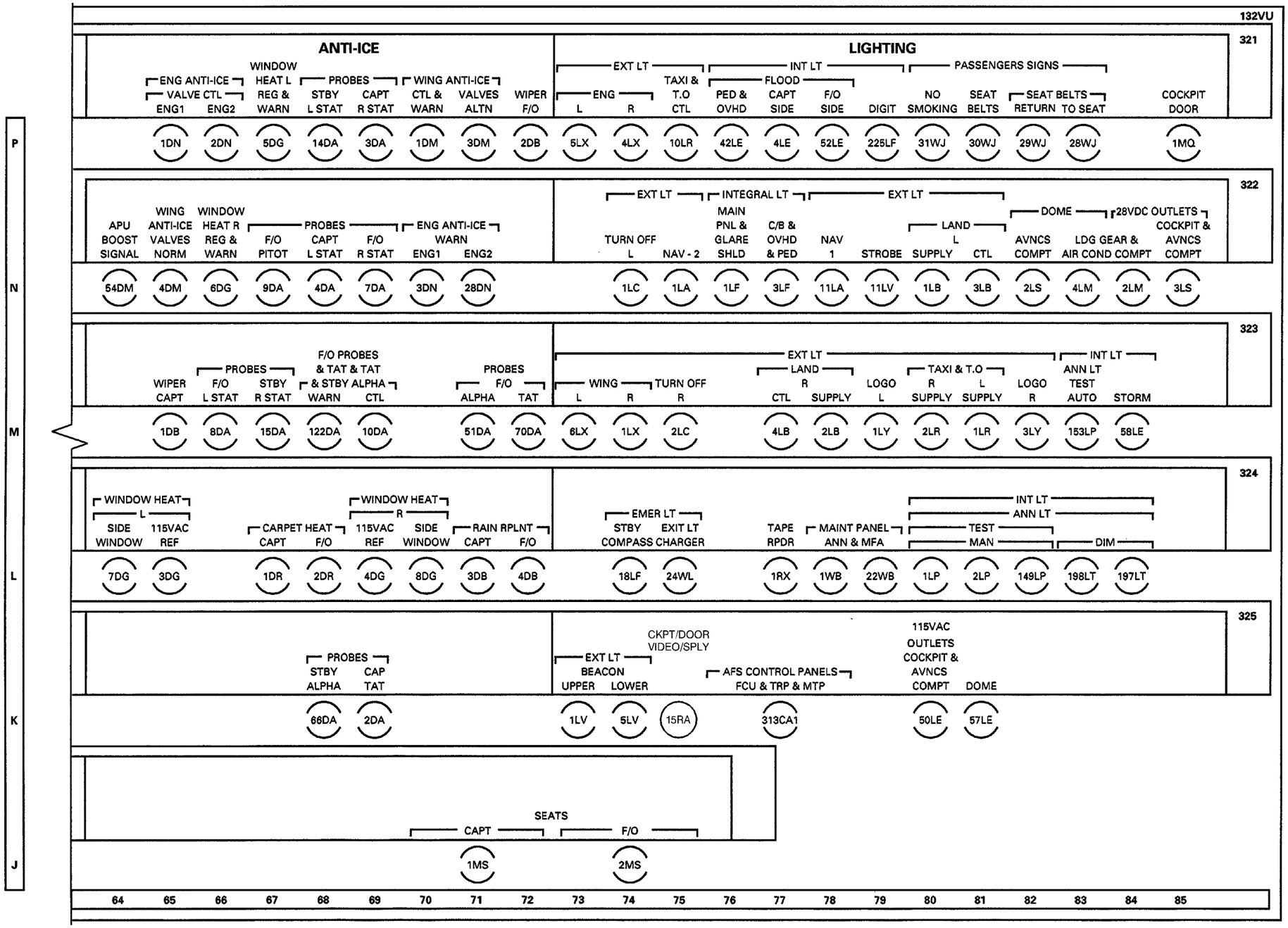


Distribution Panel 132VU - Sheet 1/2
Figure 008

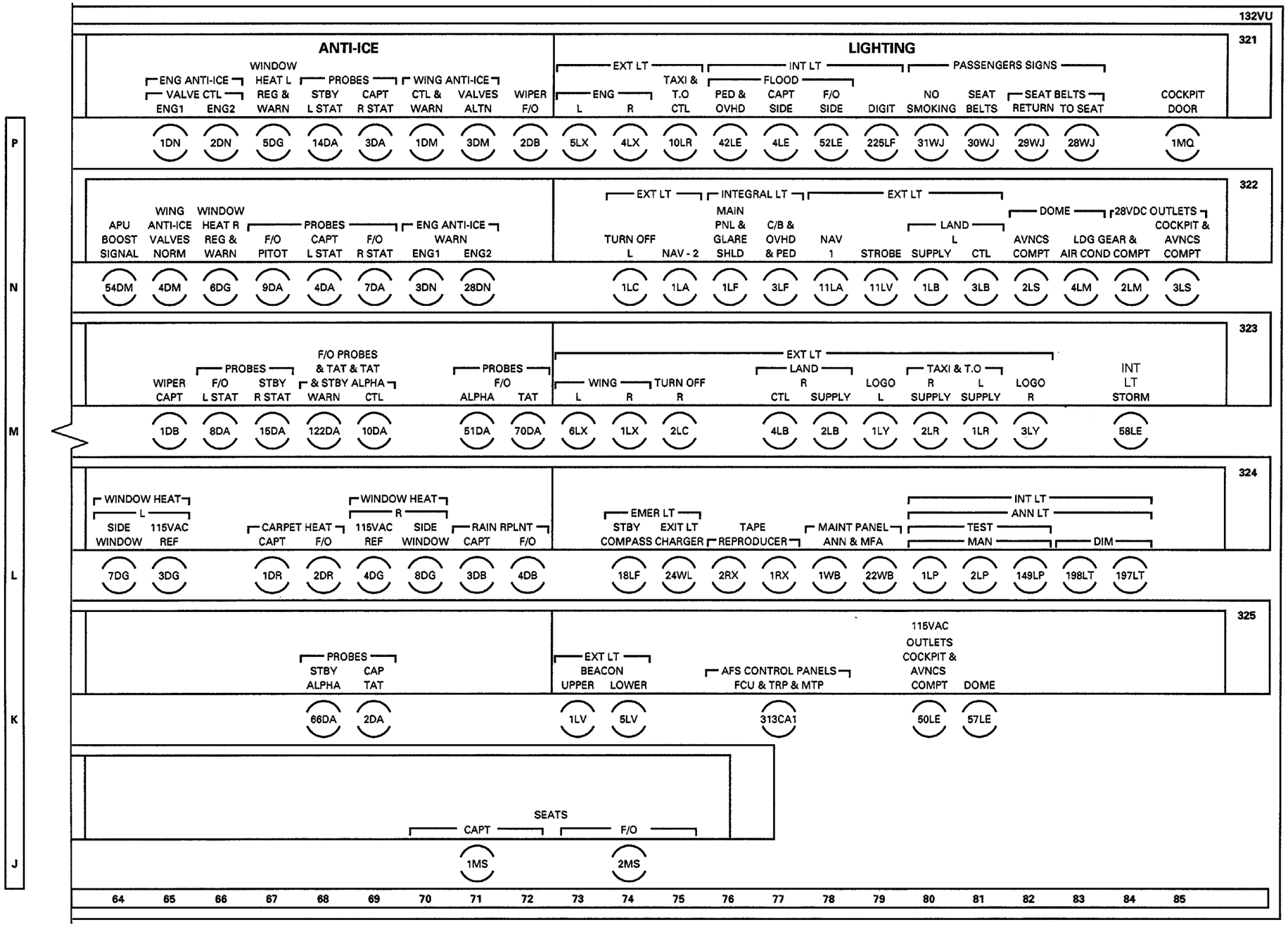
R



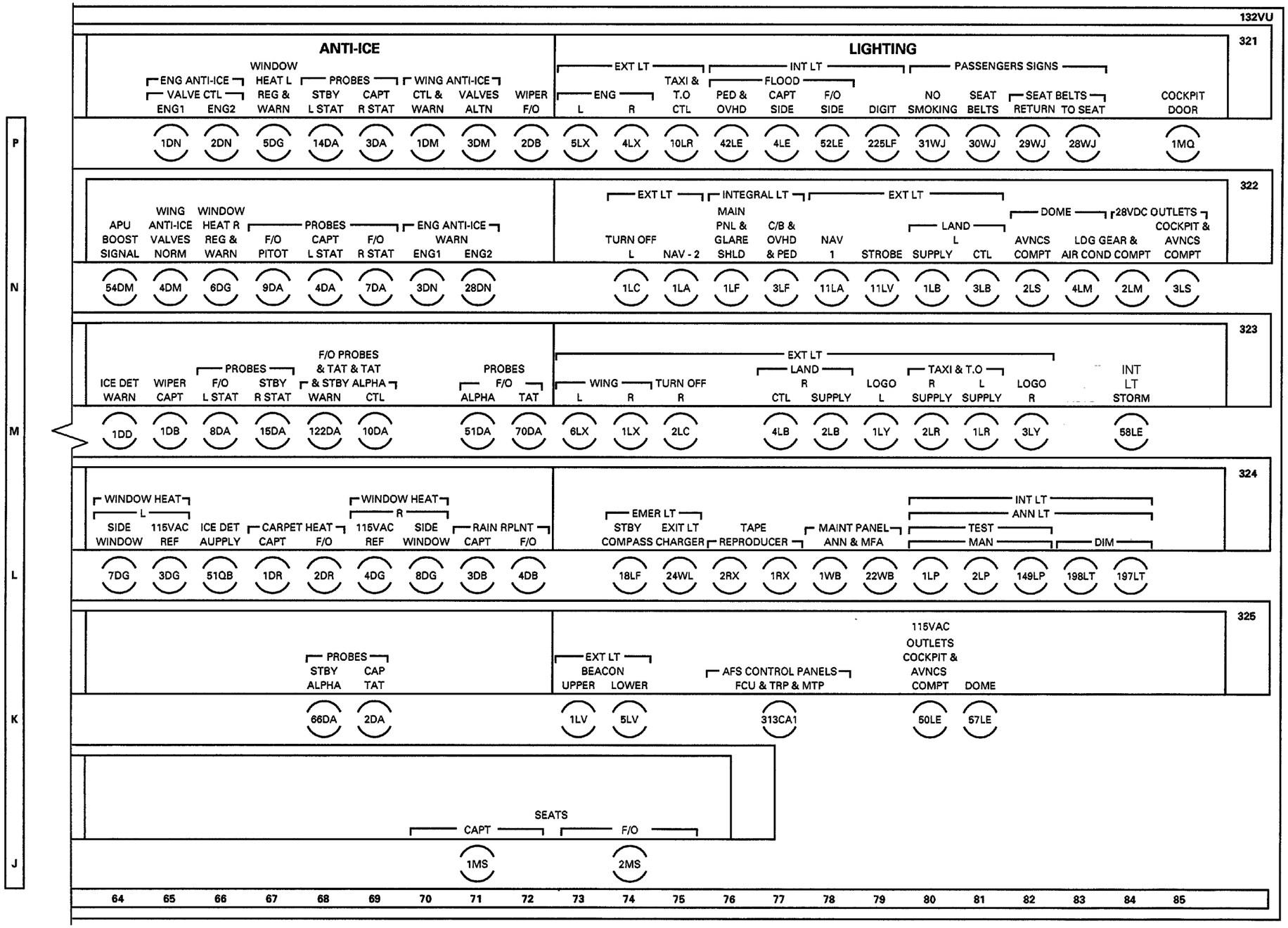
Distribution Panel 132VU - Sheet 2/2
Figure 009



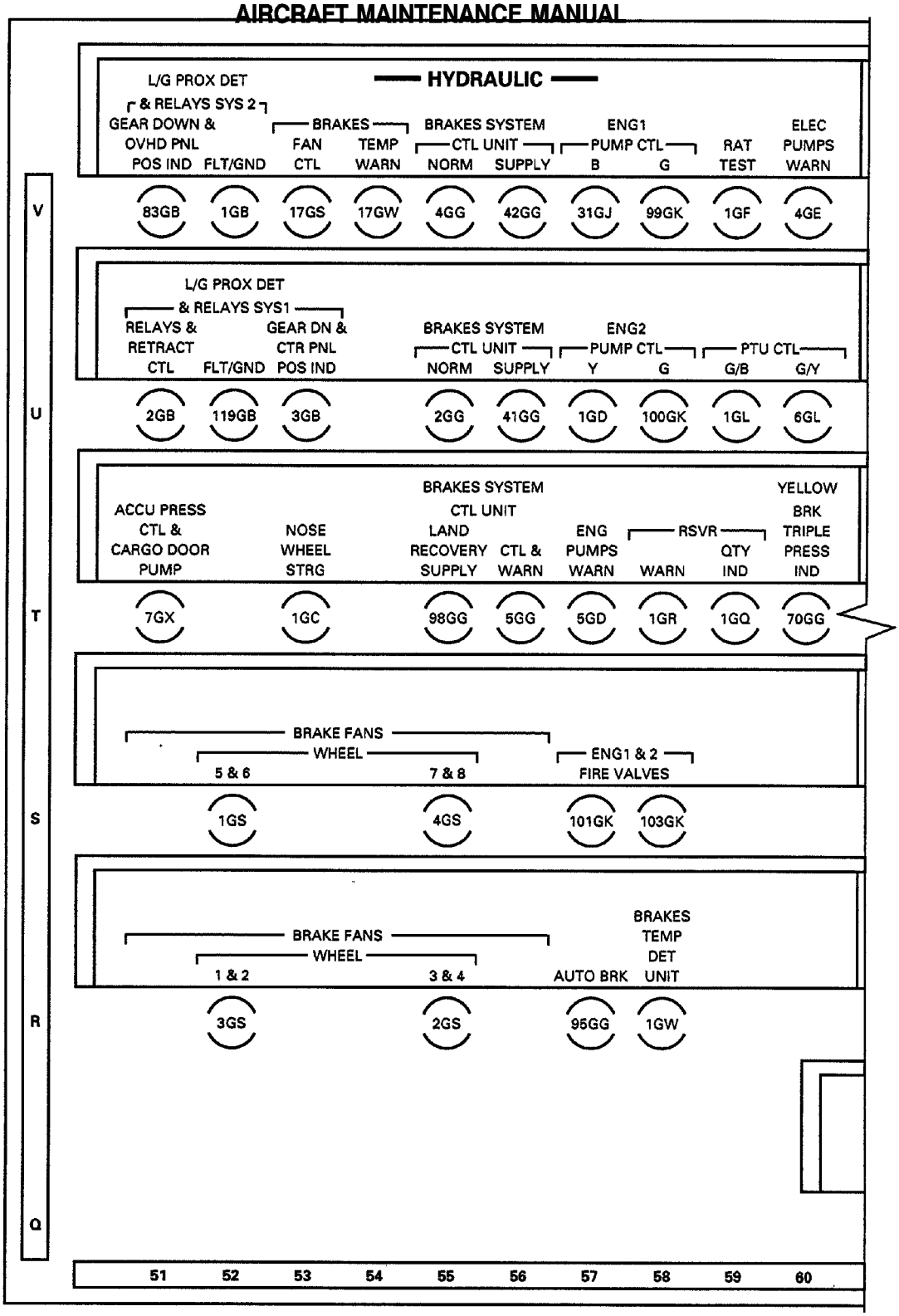
Distribution Panel 132VU - Sheet 2/2
Figure 010



Distribution Panel 132VU - Sheet 2/2
Figure 011



Distribution Panel 132VU - Sheet 2/2
Figure 012



BM5 24 50 20 0 RAMO - 00

Distribution Panel 133VU - Sheet 1/2
Figure 013

**ON A/C 101-200,

(Ref. Fig. 014)

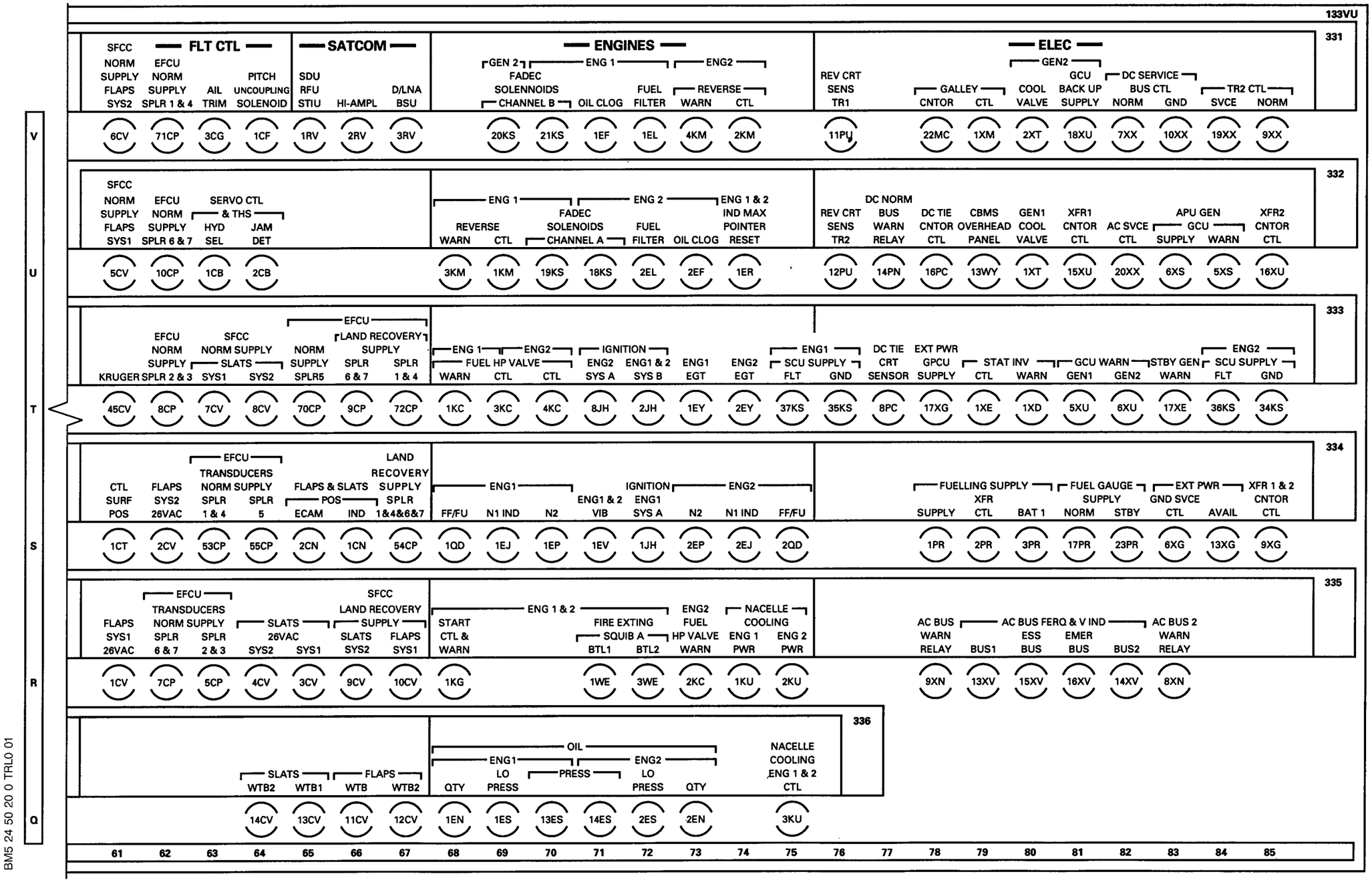
**ON A/C 101-200,

Post SB 72-2032 For A/C 101-200,

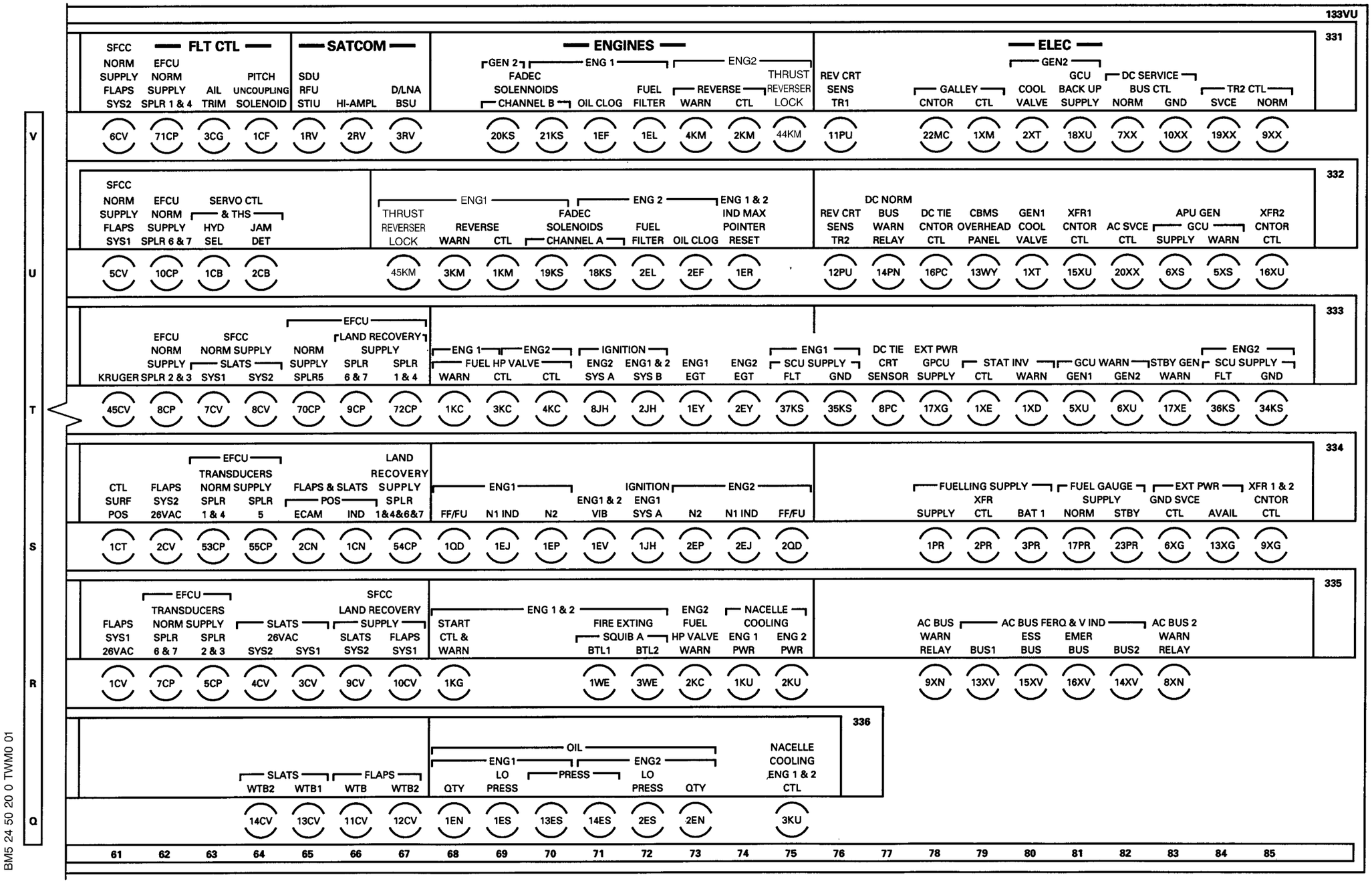
(Ref. Fig. 015)

**ON A/C 001-100,

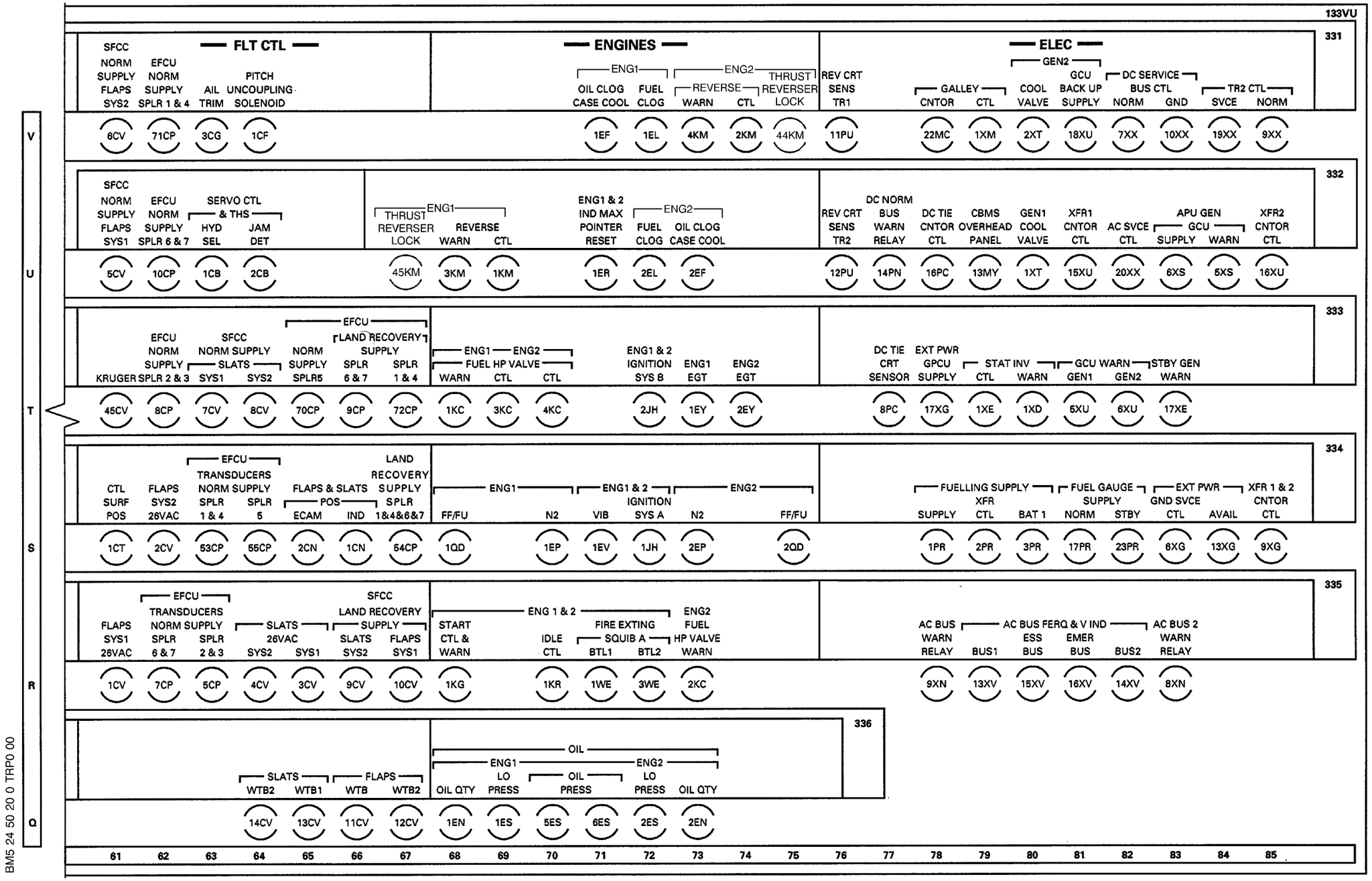
(Ref. Fig. 016)



Distribution Panel 133VU - Sheet 2/2
Figure 014



Distribution Panel 133VU - Sheet 2/2
Figure 015



BM5 24 50 20 0 TRP0 00

Distribution Panel 133VU - Sheet 2/2
Figure 016

1. General
Circuit breaker panels 800VU and 811VU are located forward and aft of the passenger compartment respectively. The circuit breakers on the above panels are connected to both AC and DC aircraft electrical systems.

2. Description
Only circuit breaker front faces and electrical identifiers are shown in figures.

A. Circuit Breaker Panel 800VU

R **ON A/C 101-104,

Circuit Breaker Panel 800VU (Ref. Fig. 001)

**ON A/C 001-100,

Circuit Breaker Panel 800VU (Ref. Fig. 002)

**ON A/C 001-004,

Circuit Breaker Panel 800VU (Ref. Fig. 003)

**ON A/C 005-100,

Circuit Breaker Panel 800VU (Ref. Fig. 004)

R **ON A/C 105-200,

R Circuit Breaker Panel 800VU (Ref. Fig. 005)

**ON A/C ALL

B. Circuit Breaker Panel 811VU

**ON A/C 001-100,

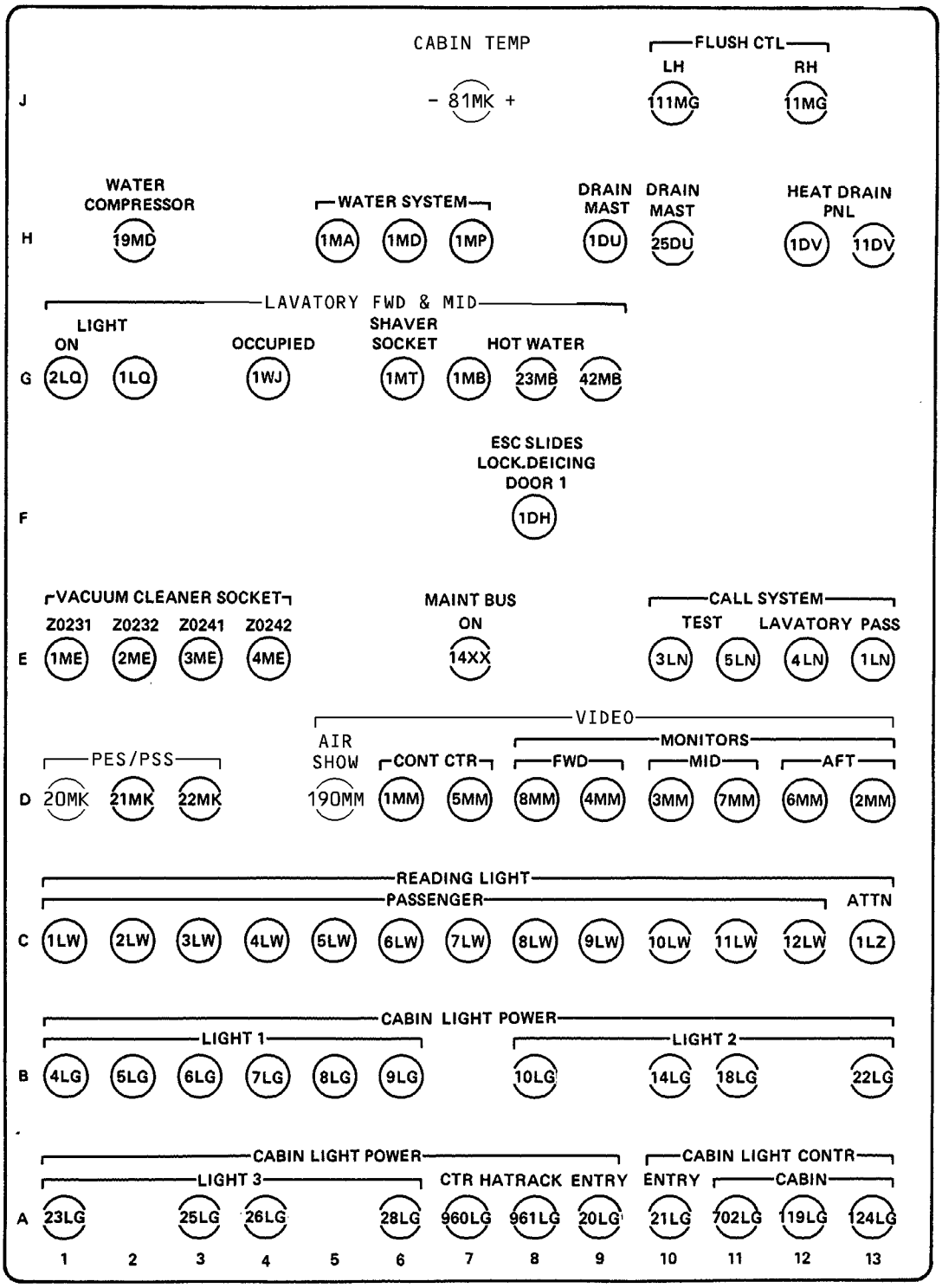
Circuit Breaker Panel 811VU (Ref. Fig. 006)

R **ON A/C 101-104,

Circuit Breaker Panel 811VU (Ref. Fig. 007)

R **ON A/C 105-200,

R Circuit Breaker Panel 811VU (Ref. Fig. 008)



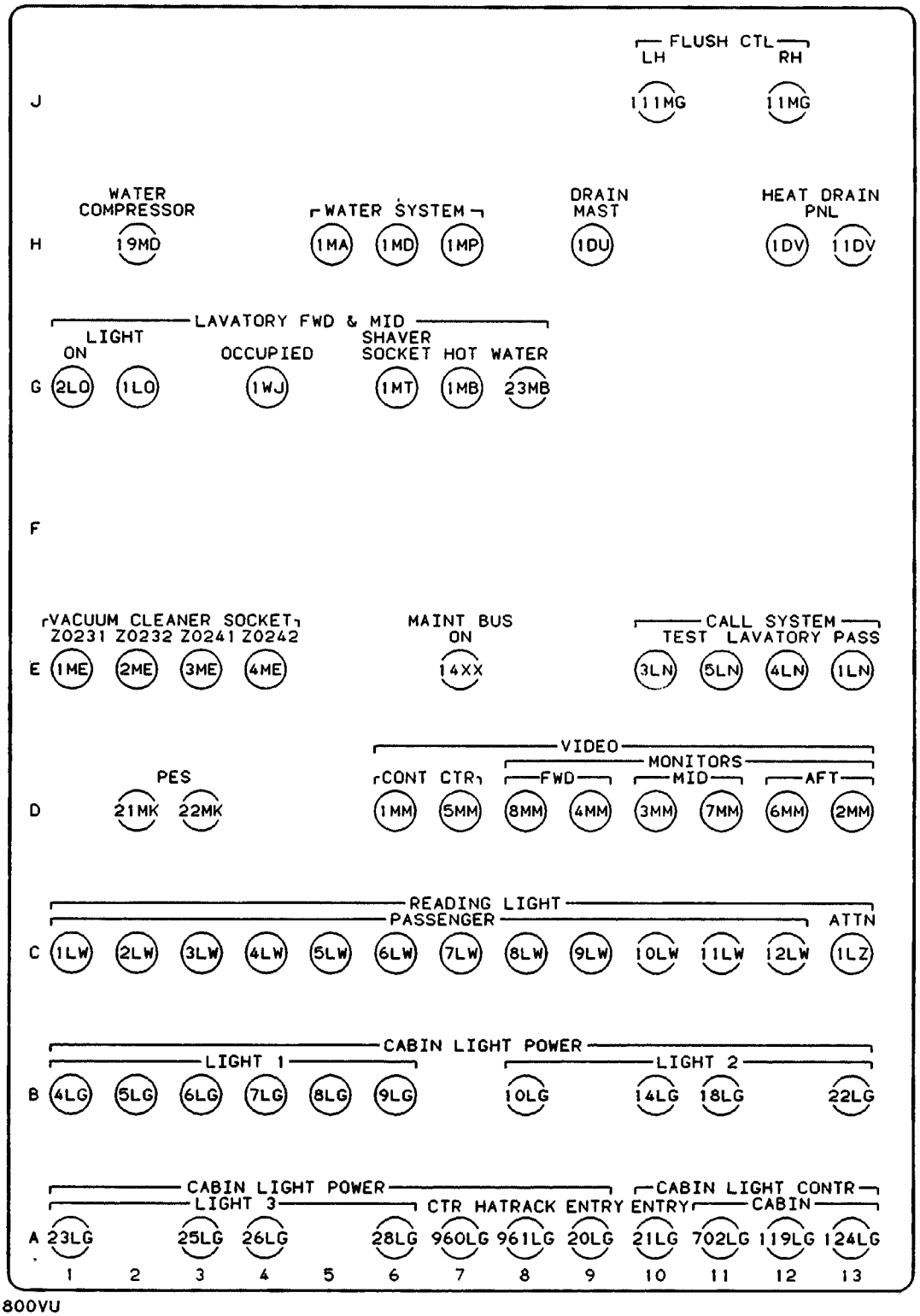
800VU

BM6 24 50 30 0 GBB0 00

Circuit Breaker Panel 800VU
Figure 001

R EFFECTIVITY: 101-104,

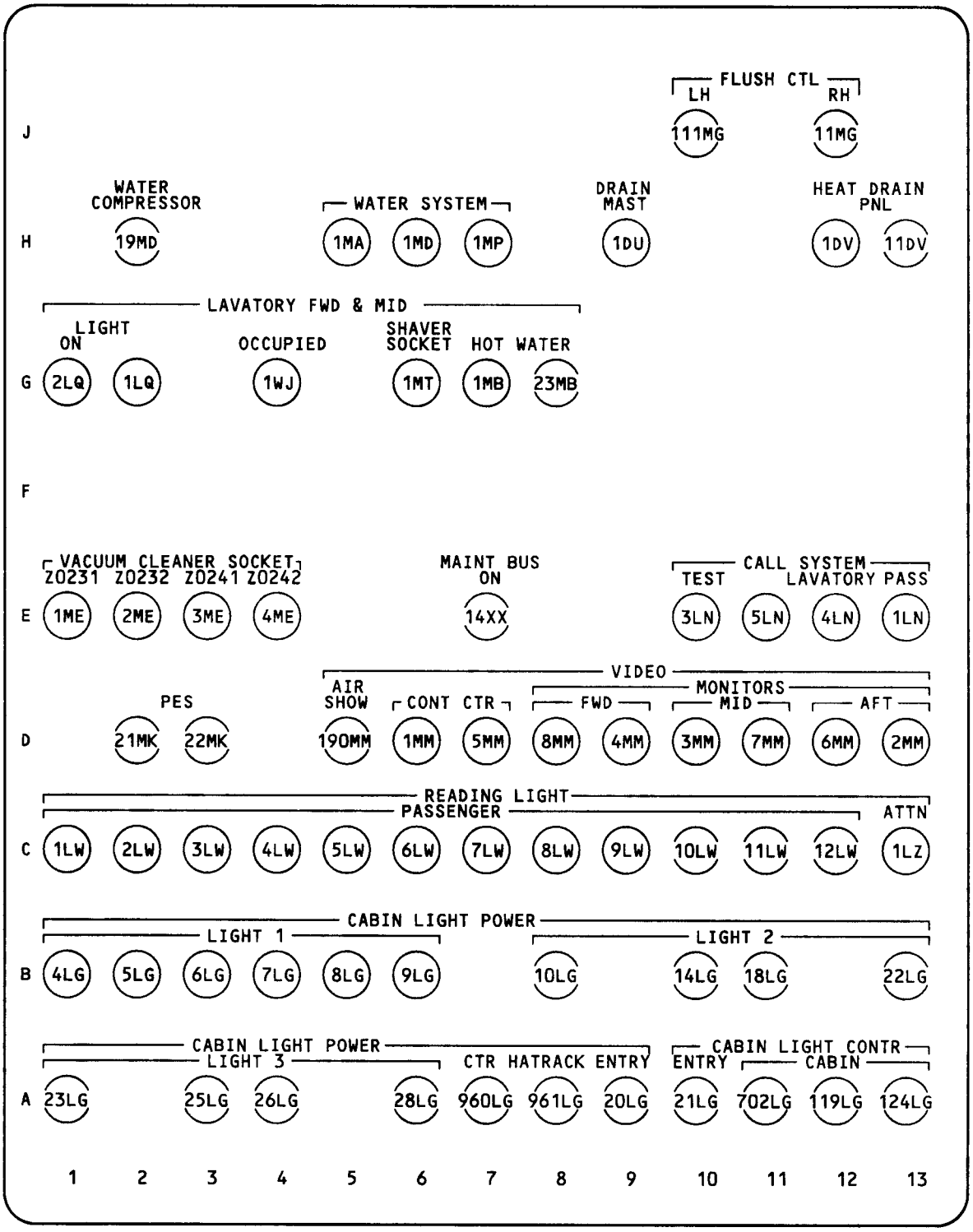
PIA



800VU

B M 6 24 50 30 0 DALO 00

Circuit Breaker Panel 800VU
Figure 002

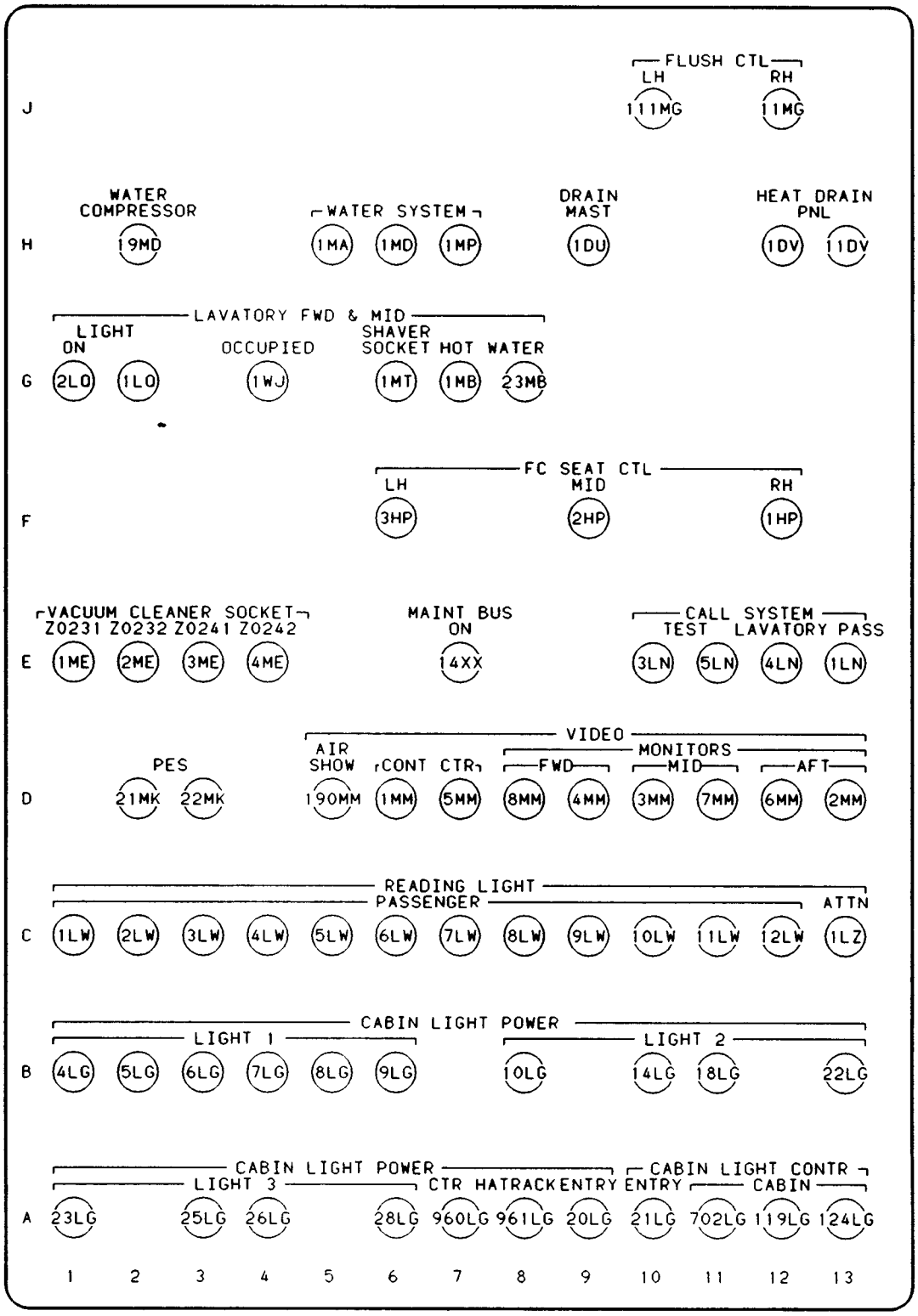


B M 6 24 50 30 0 EADO 01

Circuit Breaker Panel 800VU
Figure 003

R EFFECTIVITY: 001-004,

PIA

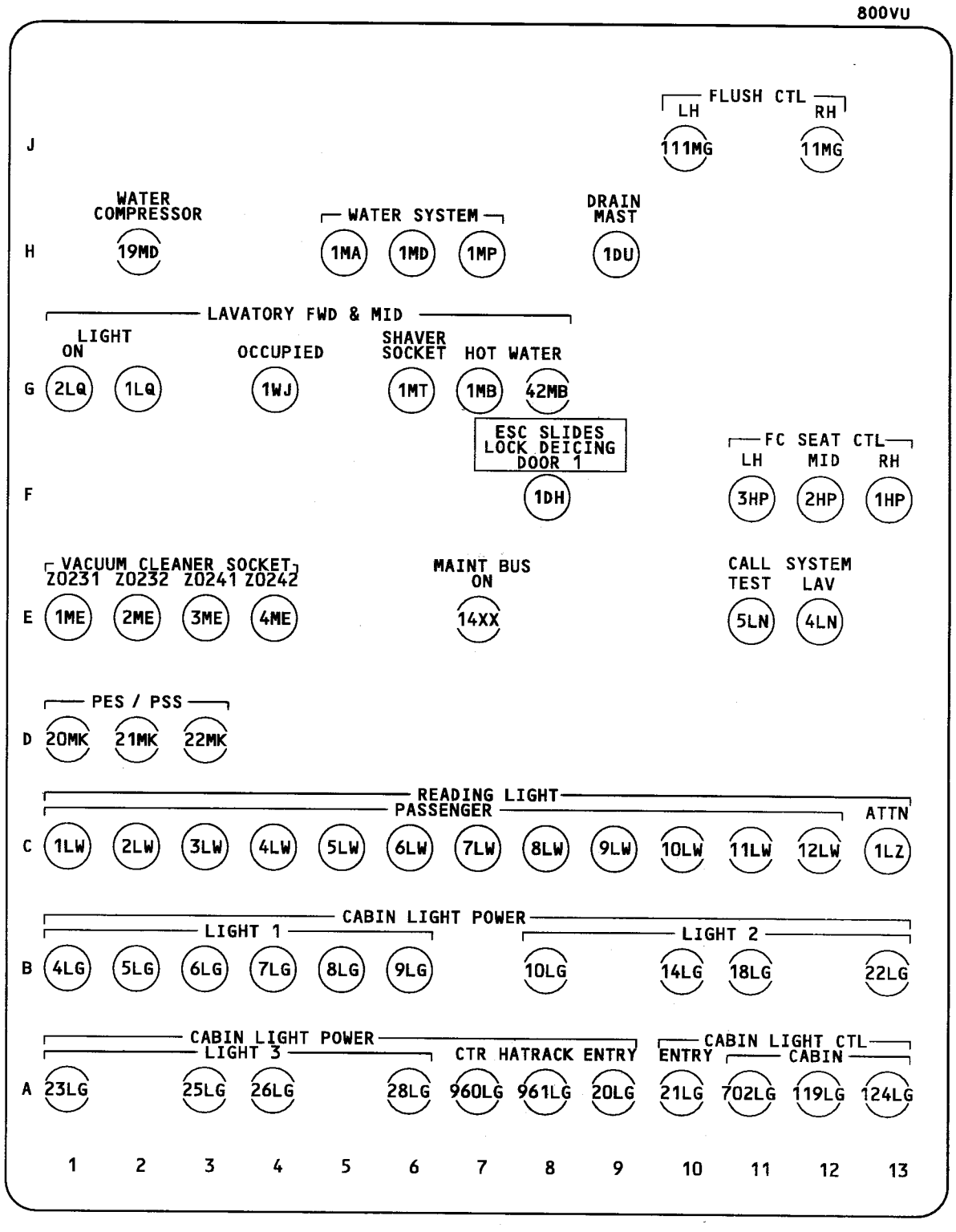


B M 6 24 50 30 0 EAM0 00

Circuit Breaker Panel 800VU
Figure 004

R EFFECTIVITY: 005-100,

PIA

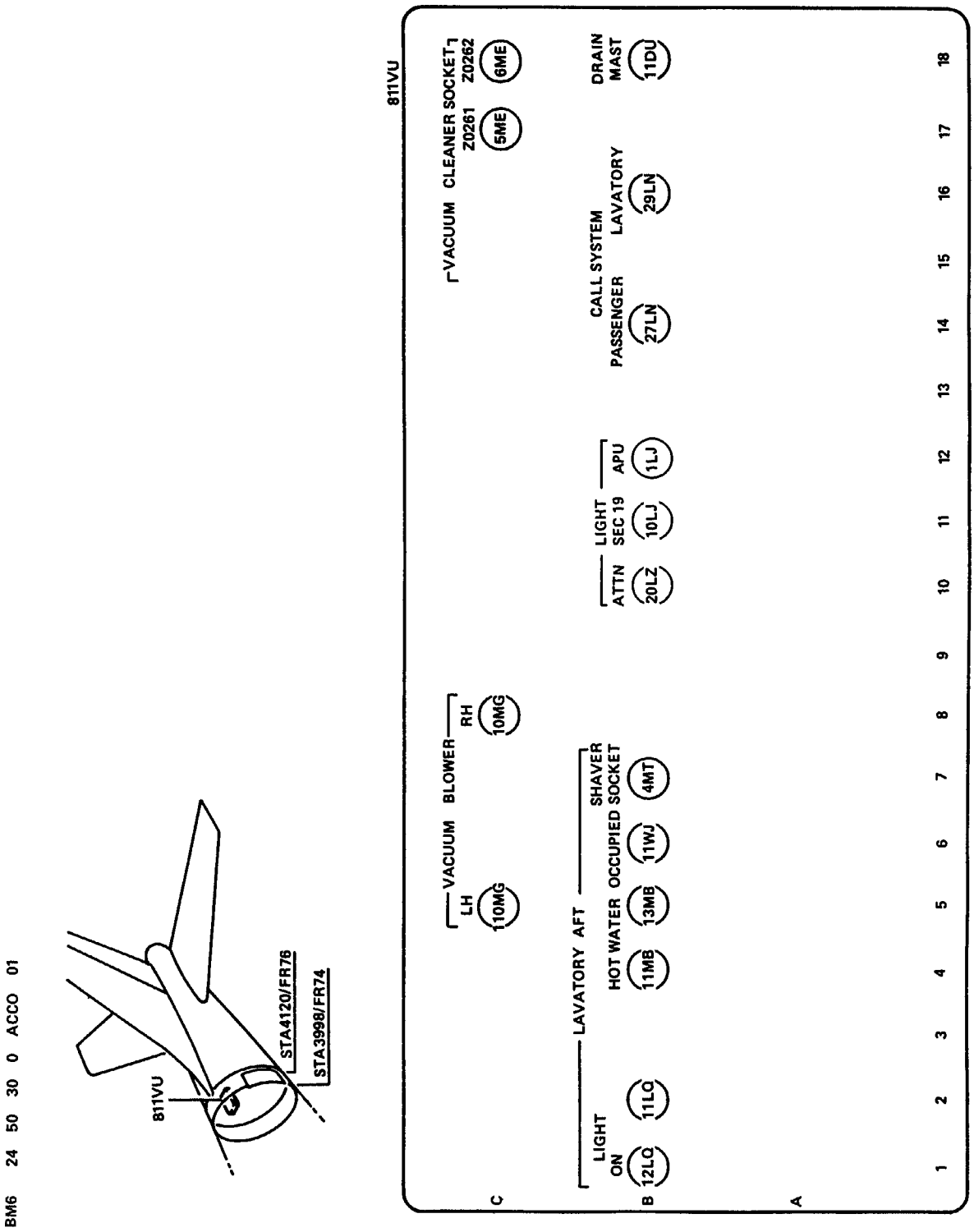


Circuit Breaker Panel 800VU
Figure 005

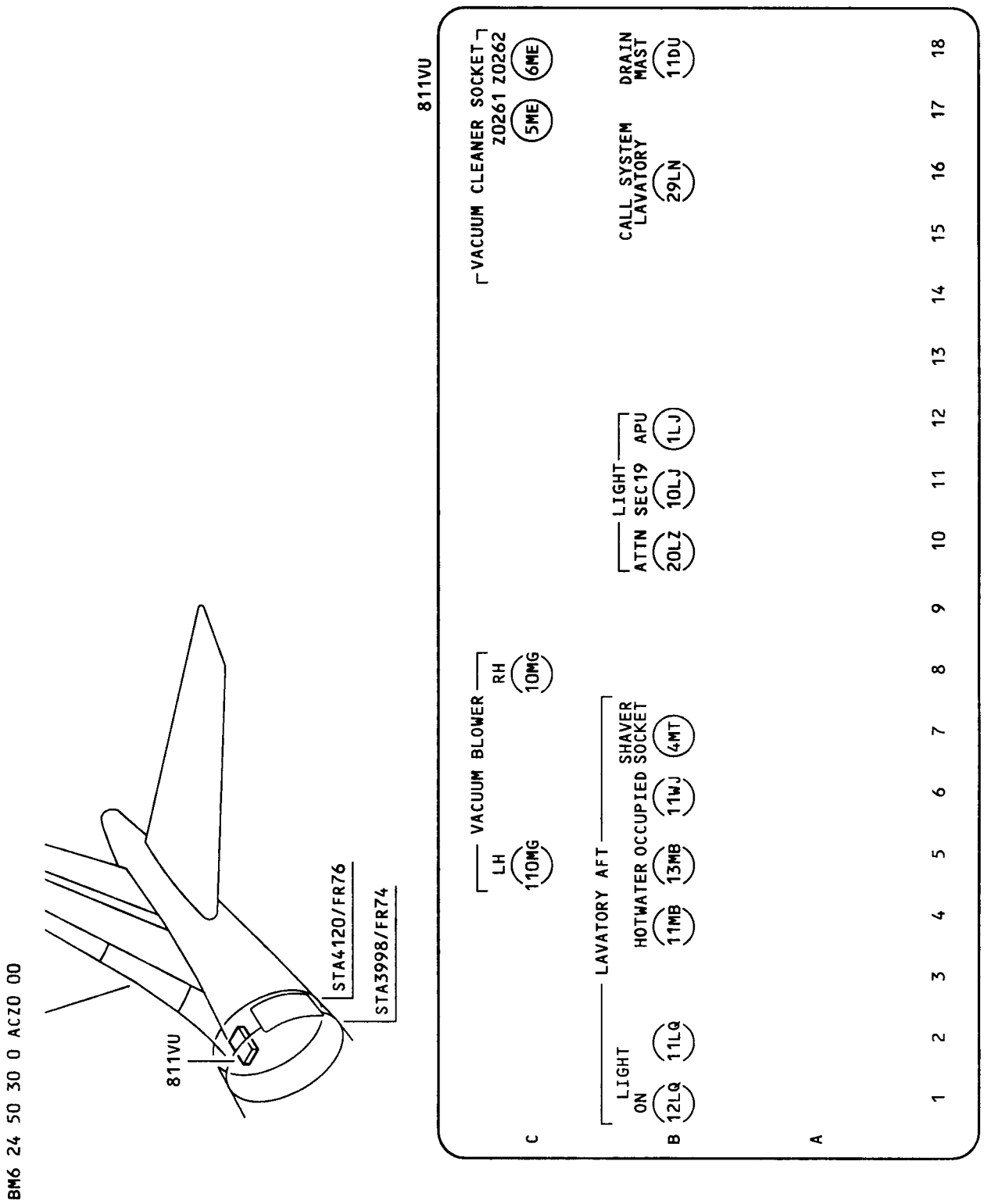
R

R EFFECTIVITY: 105-200,

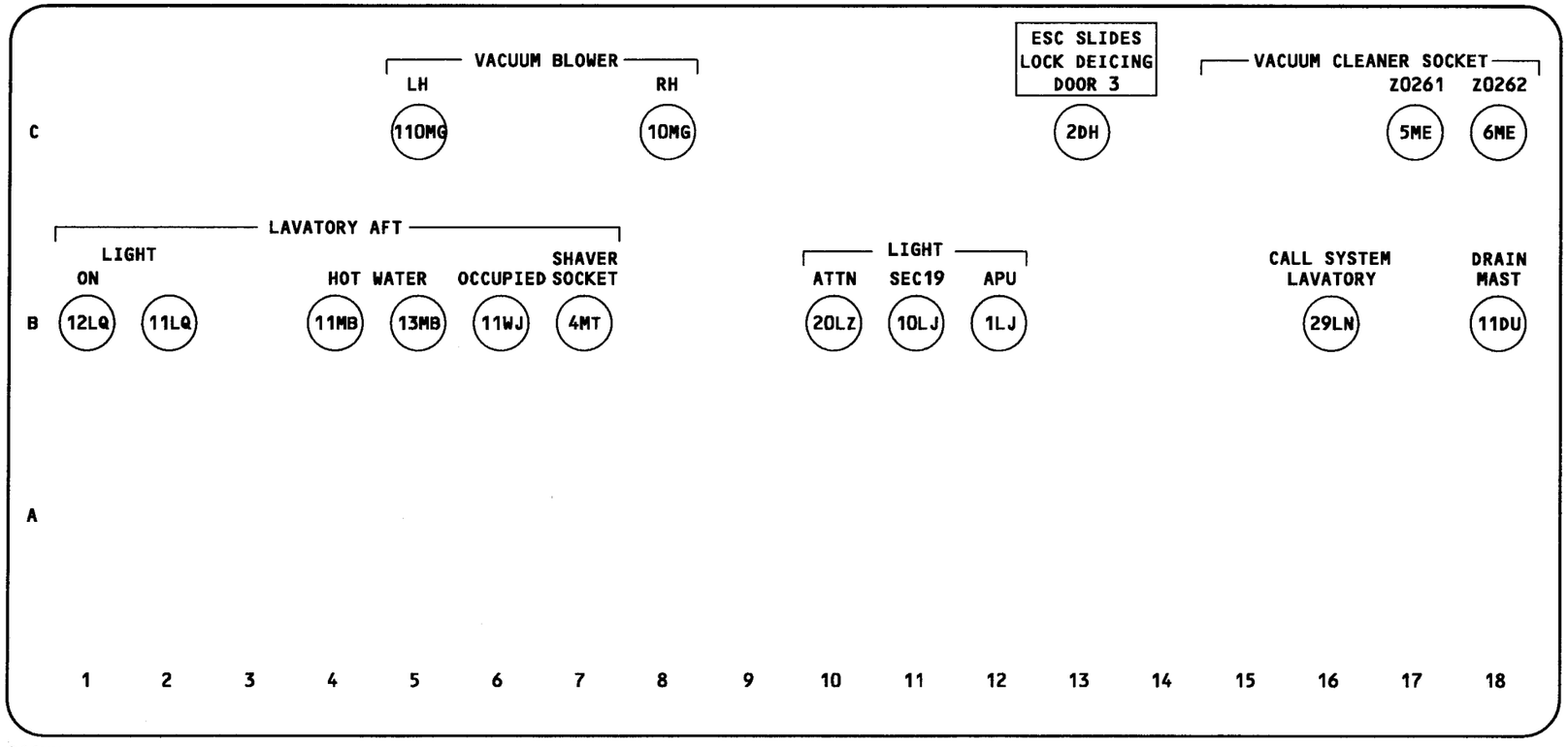
PIA



Circuit Breaker Panel 811VU
Figure 006



Circuit Breaker Panel 811VU
Figure 007



811VU

BM6 24 50 30 0 ADS0 00

R

Circuit Breaker Panel 811VU
Figure 008

CIRCUIT BREAKER PANEL 100VU - DESCRIPTION AND OPERATION

1. General

Circuit breaker panel assembly 100VU is comprised of circuit breaker panels 101VU, 106VU and 281VU. The circuit breakers on the above panels are connected to both aircraft electrical generations.
- AC generation.
- DC generation.

Each circuit breaker is marked with the FIN (Functional Item Number) shown on the back of the VU panel.

2. Description

Circuit breakers on panels 101VU, 106VU and 281VU are accessible only if the doors of the corresponding racks are open. Only circuit breaker faces and electrical identifiers are shown in figures.

A. Circuit breaker Panel 101VU

R **ON A/C 001-003,

(Ref. Fig. 001)

R **ON A/C 001-100,

Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 002)

**ON A/C 101-200,

(Ref. Fig. 003)

**ON A/C 001-100,

(Ref. Fig. 004)

**ON A/C 101-200,

(Ref. Fig. 005)

**ON A/C ALL

(Ref. Fig. 006)
(Ref. Fig. 007)

B. Circuit Breaker Panel 106VU
(Ref. Fig. 008)

C. Circuit Breaker Panel 281VU
(Ref. Fig. 009)

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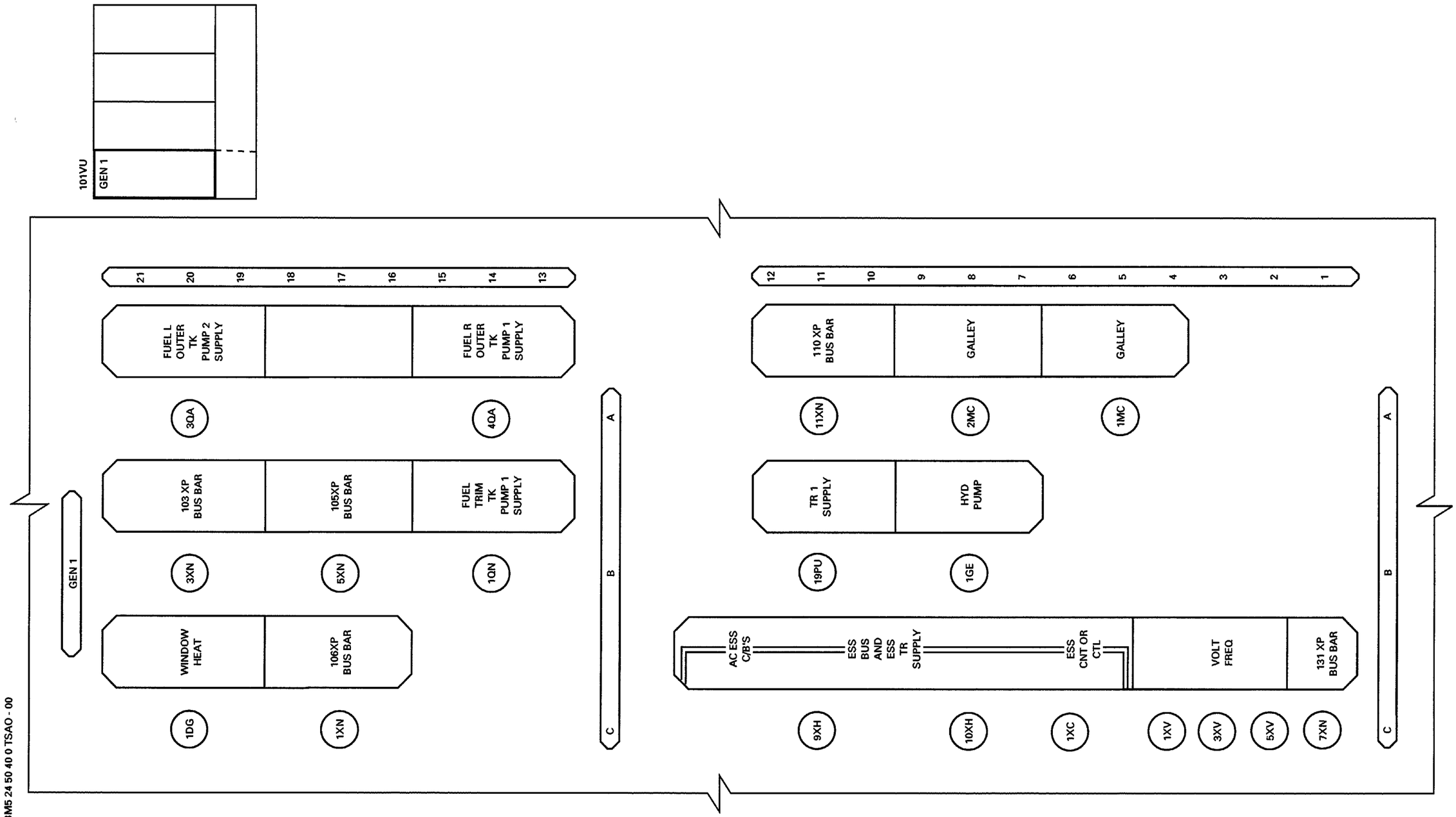
Printed in France



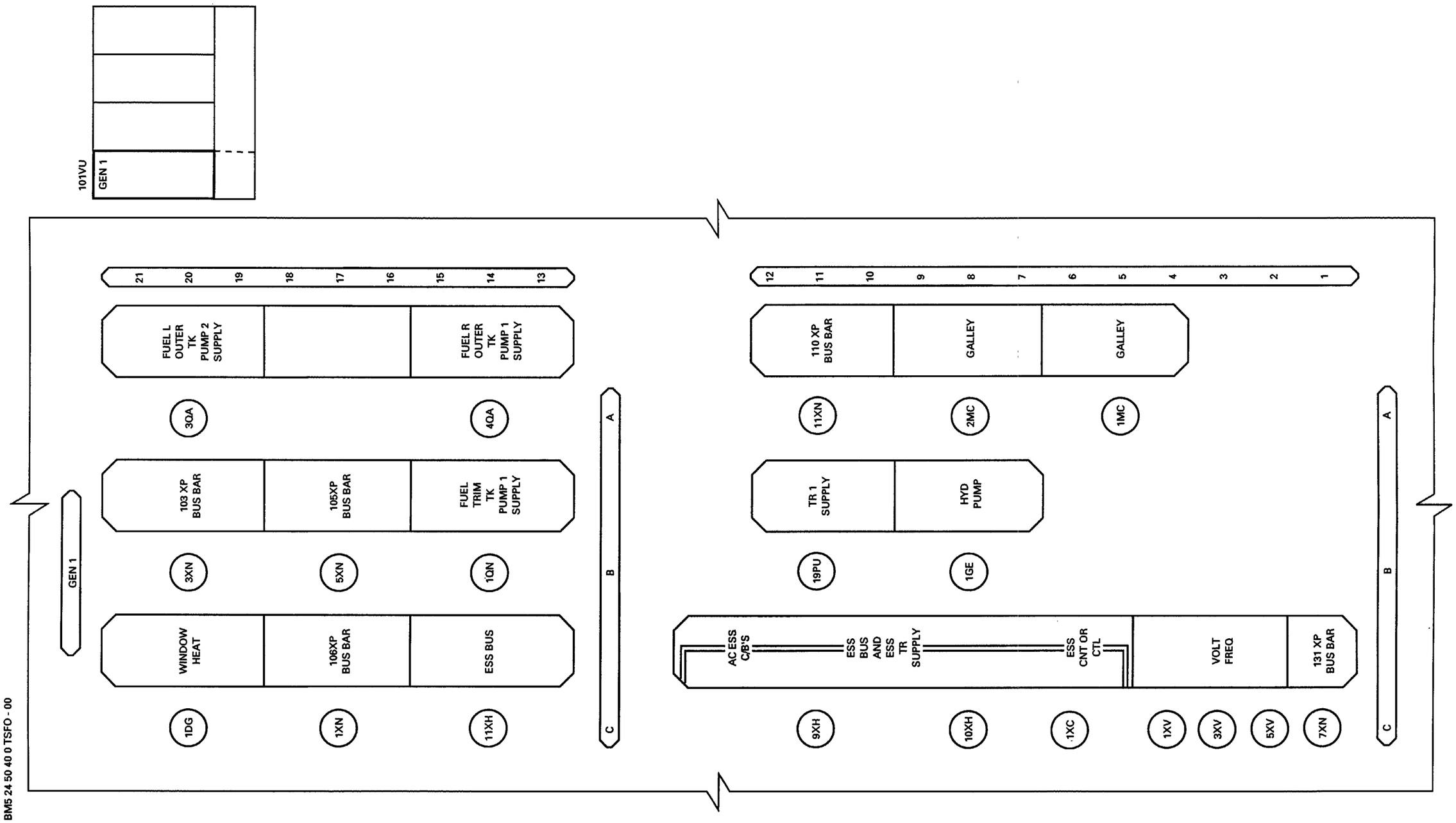
BMS 24 50 40 0 TSAO - 00

Panel 101VU - GEN 1
Figure 001

R EFFECTIVITY: 001-003,

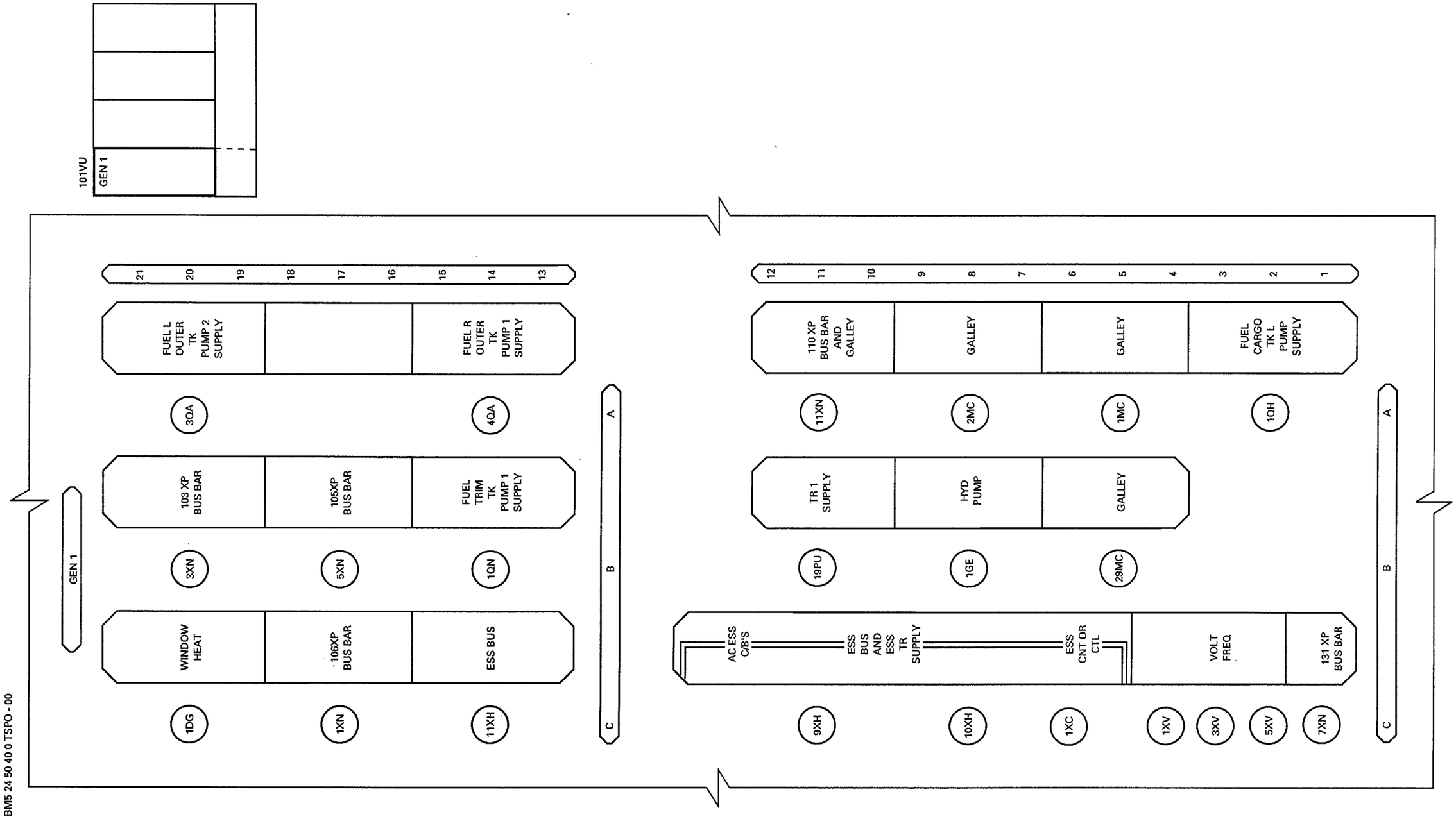
PIA

Printed in France



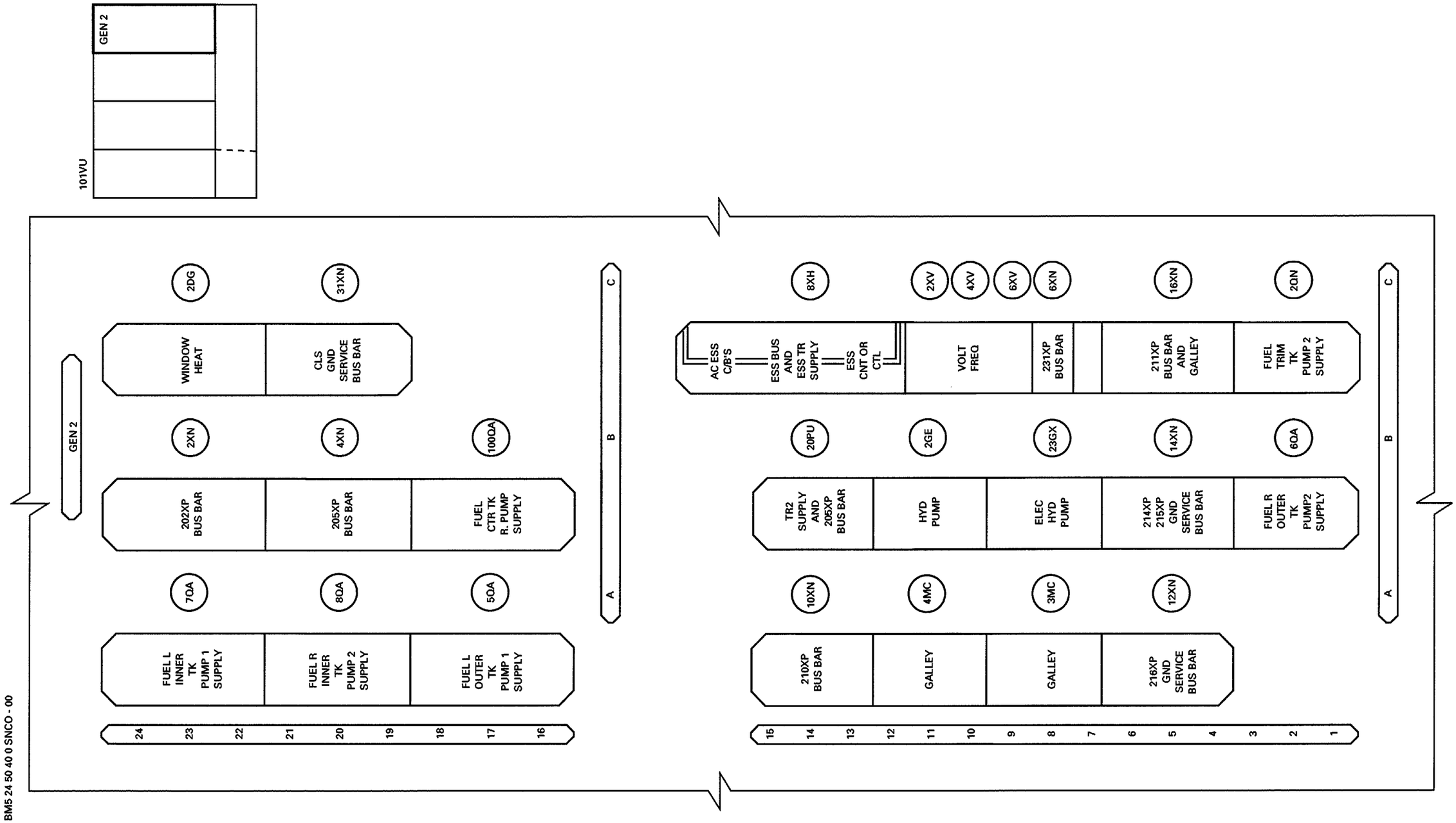
BM5 24 50 40 0 TSFO - 00

Panel 101VU - GEN 1
Figure 002



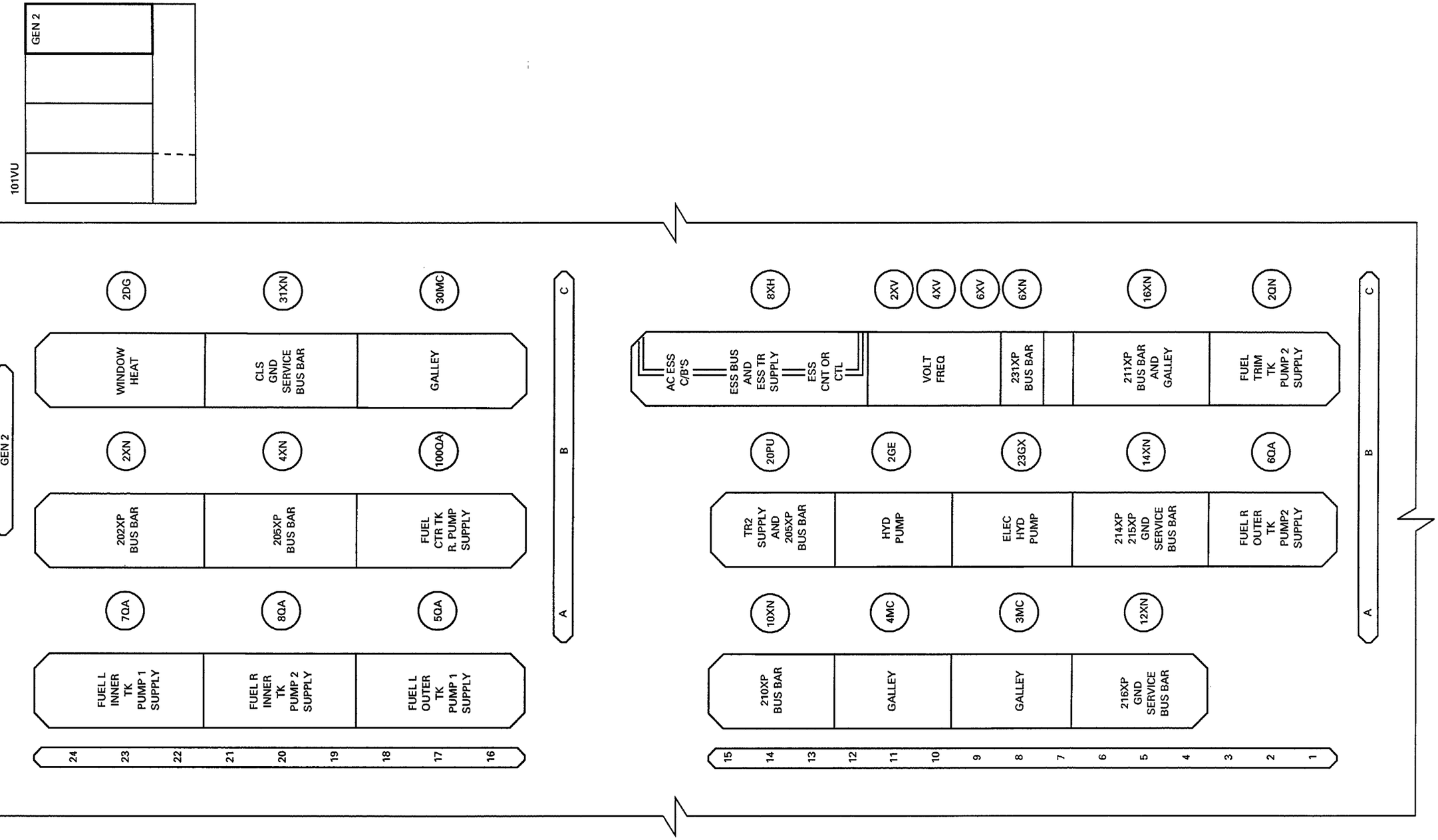
BM5 24 50 40 0 TSPO - 00

Panel 101VU - GEN 1
Figure 003



BM5 24 50 40 0 SNCO - 00

Panel 101VU - GEN 2
Figure 004



BM5 24 50 40 0 SREO - 00

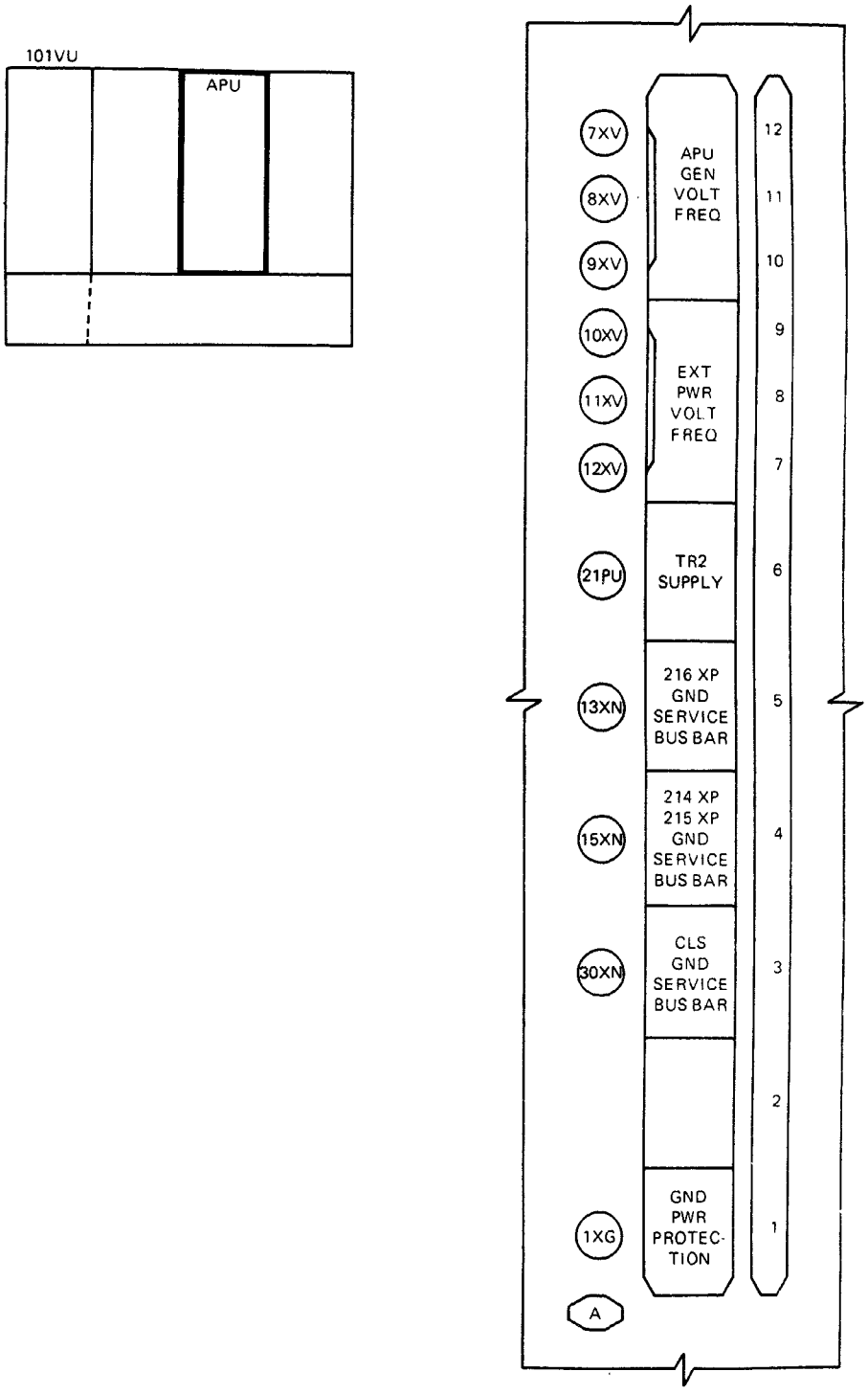
Panel 101VU - GEN 2
Figure 005

R

R EFFECTIVITY: 101-200,

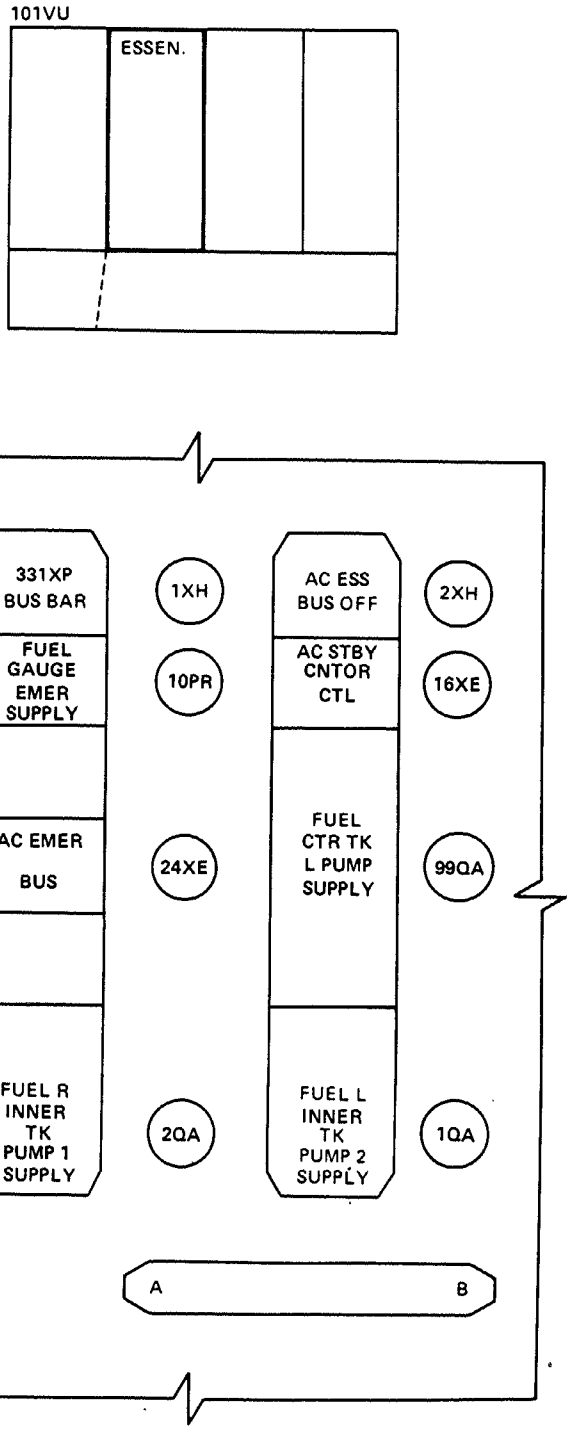
PIA

Printed in France



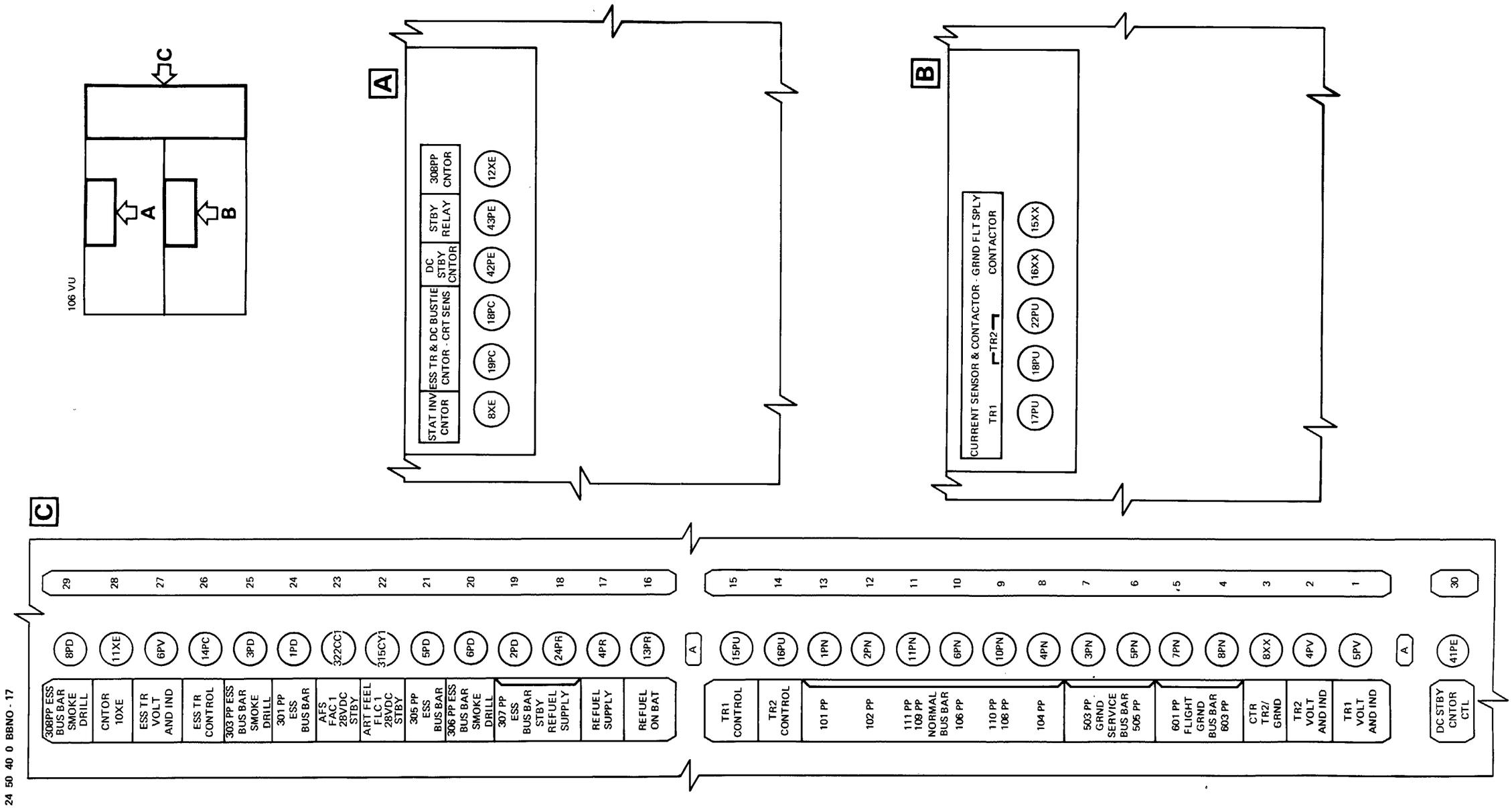
BM5 24 50 40 0 ASMO 07

Panel 101VU - APU
Figure 006



BM5 24 50 40 0 SLNO - 17

Panel 101VU - Essential Compartment
Figure 007



BM5 24 50 40 0 BBNO-17

Distribution Panel 106VU
Figure 008

EFFECTIVITY: ALL

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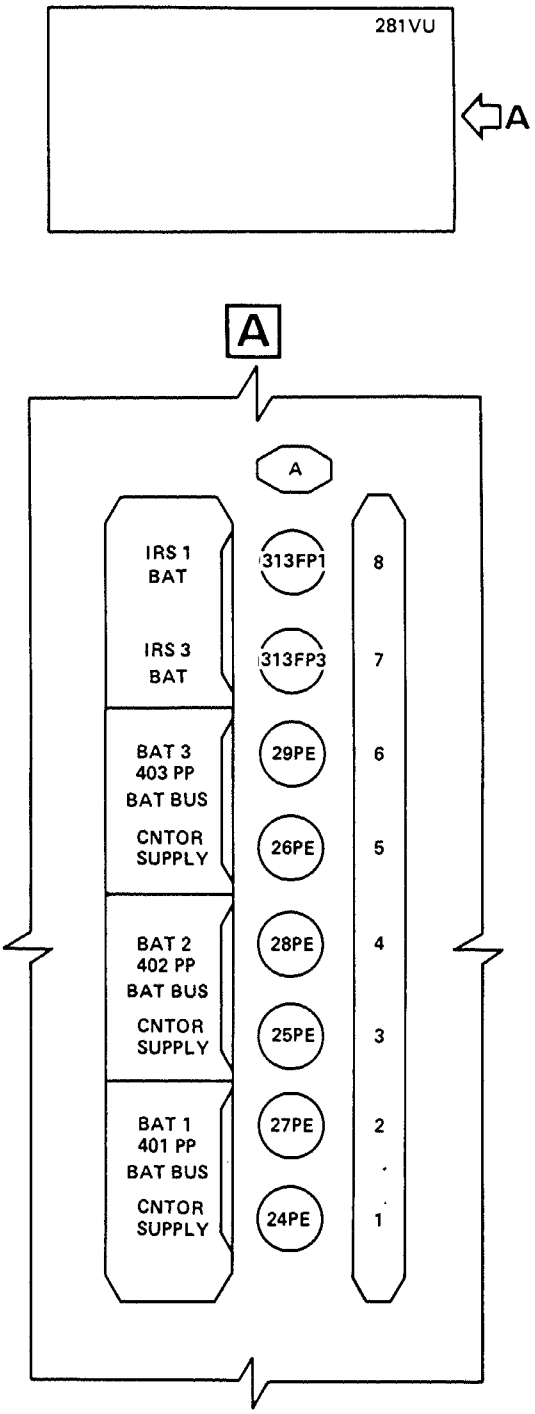


BM5 24 50 40 0 CANO 17

Panel 281VU
Figure 009

1. General

The normal AC distribution network corresponds to busbars 1XP and 2XP and the associated sub-busbars

R **ON A/C 101-101, 103-200,

(Ref. Fig. 001)

**ON A/C 001-005,

Post SB 24-2041 For A/C 001-003,

R

(Ref. Fig. 002)

**ON A/C 102-102,

R

(Ref. Fig. 003)

**ON A/C 001-003,

R

(Ref. Fig. 004)

**ON A/C 006-100,

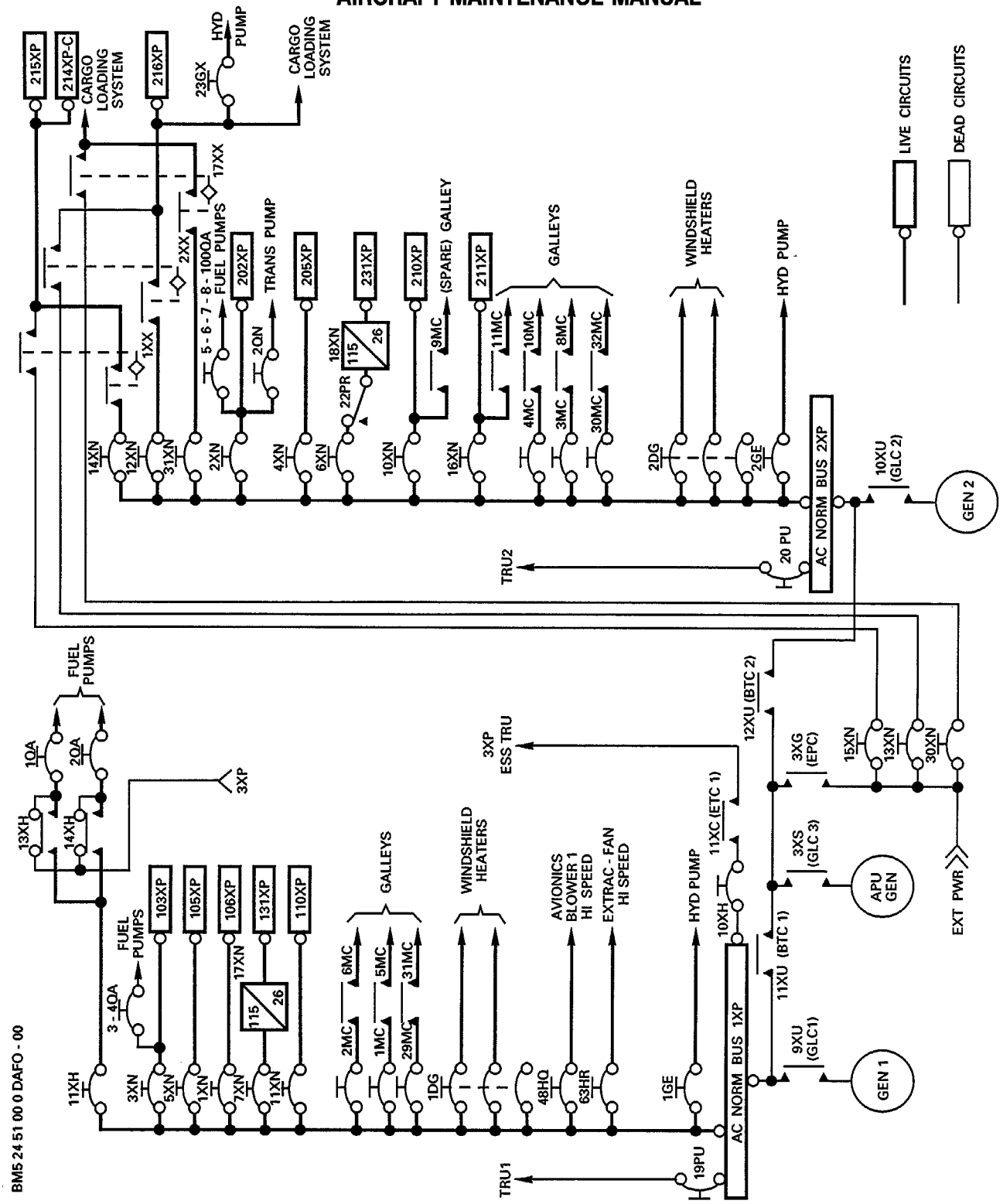
R

(Ref. Fig. 005)

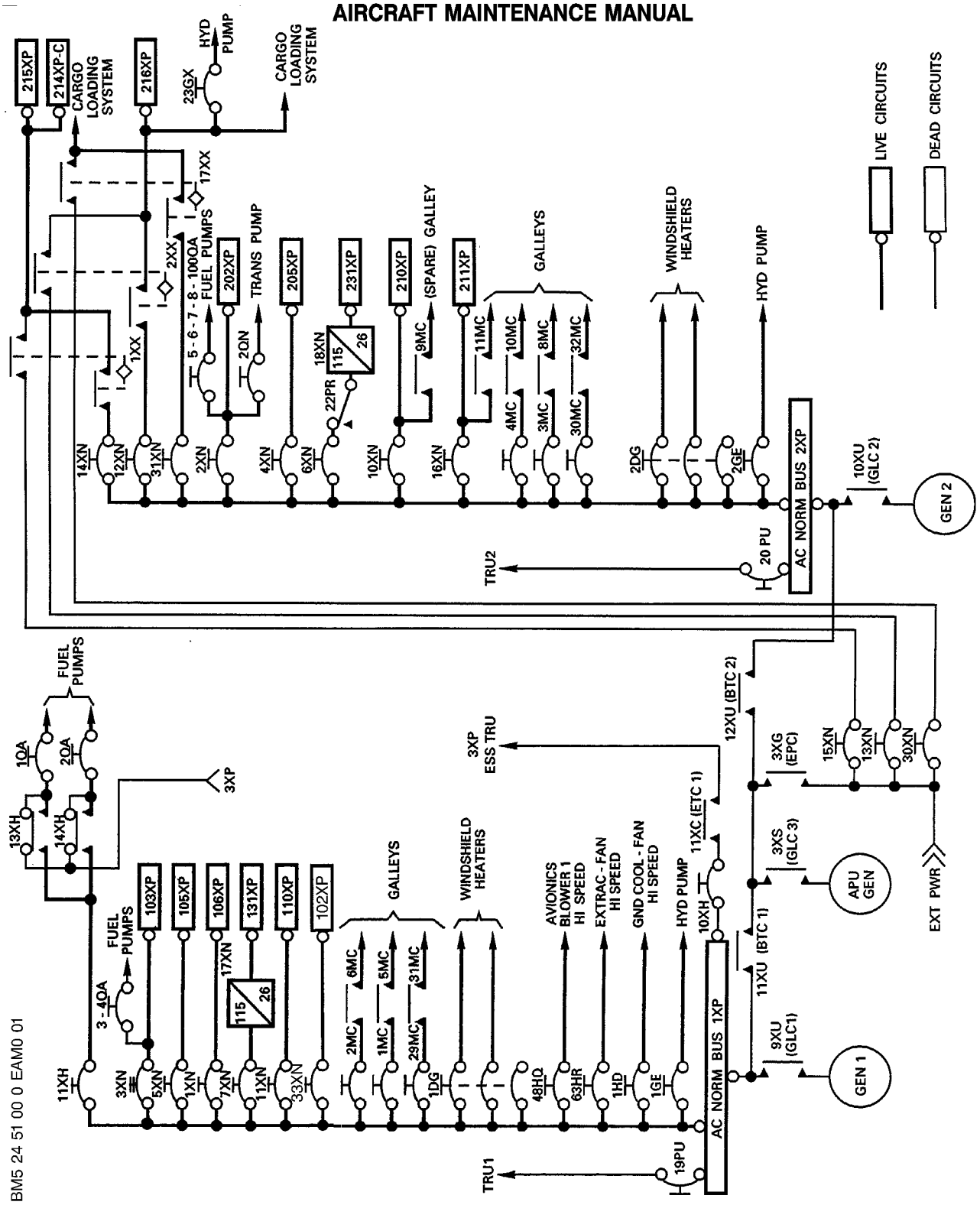
**ON A/C ALL

The main busbars can be supplied :
- either by the corresponding generator
- or by the other main generator or by the APU generator or the ground power unit by means of the transfer circuit.

The major part of the network is supplied with three phase 115V/400Hz.
A 115/26V single phase autotransformer supplying a normal 26V/400Hz sub-busbar (131XP and 231XP) is connected to each main busbar.
Characteristics :



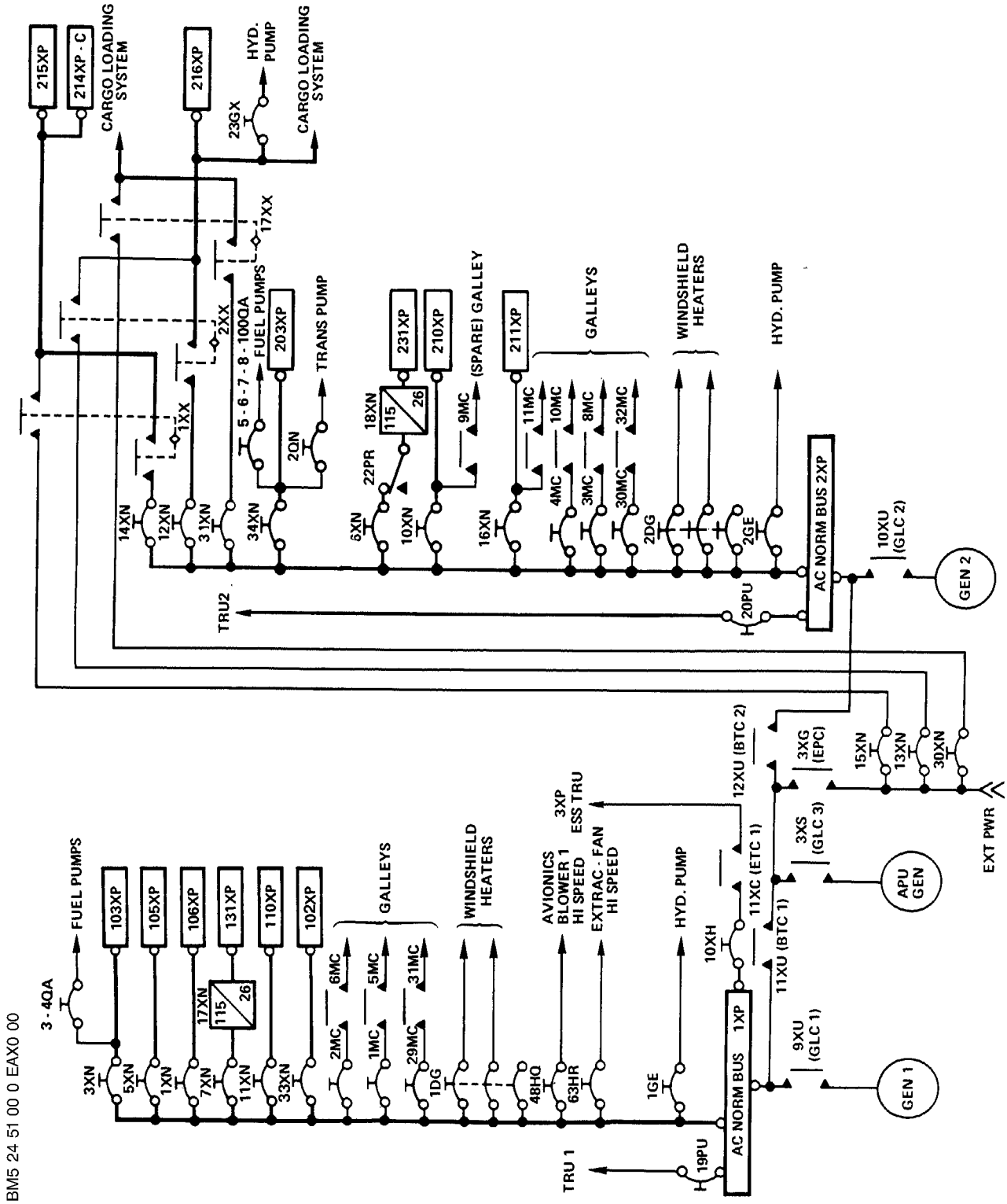
AC Normal Distribution - AC Normal Load Distribution
Figure 001



BM5 24 51 00 0 EAM0 01

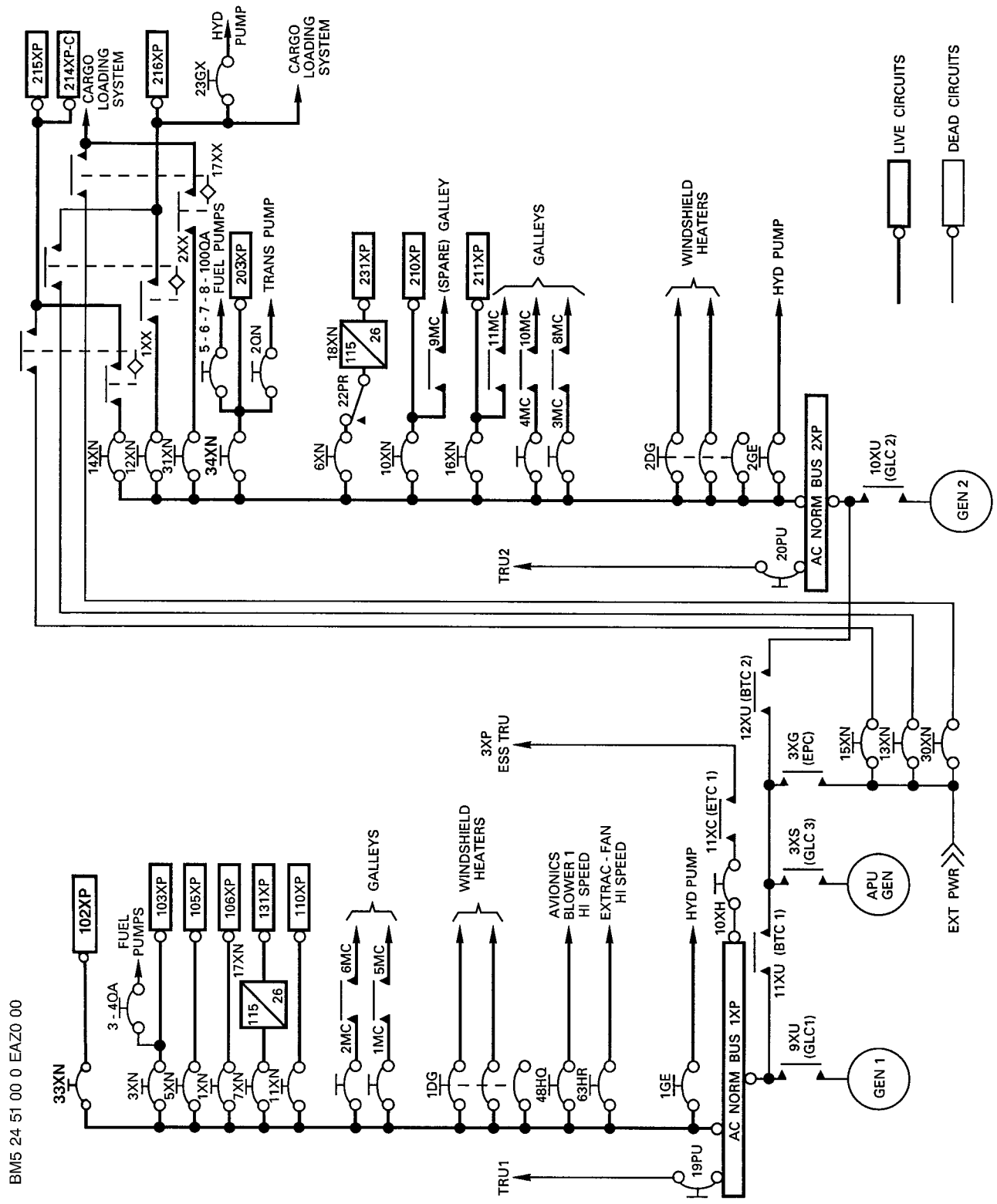
AC Normal Distribution - AC Normal Load Distribution
Figure 002

R



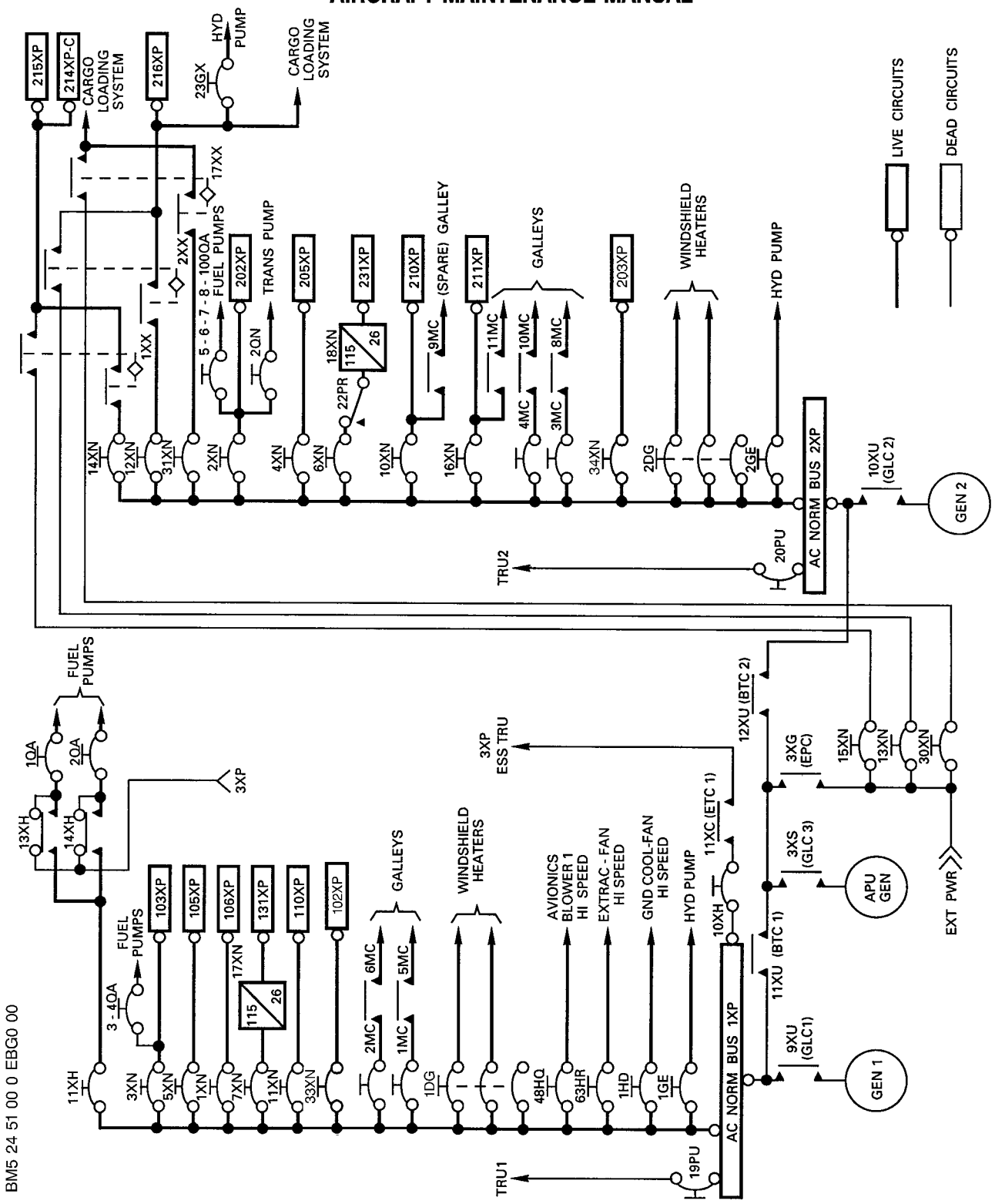
BM5 24 51 00 0 EAX0 00

AC Normal Distribution - AC Normal Load Distribution
Figure 003



BM5 24 51 00 0 EAZ0 00

AC Normal Distribution - AC Normal Load Distribution
Figure 004



AC Normal Distribution - AC Normal Load Distribution
Figure 005

R

R EFFECTIVITY: 006-100,

PIA

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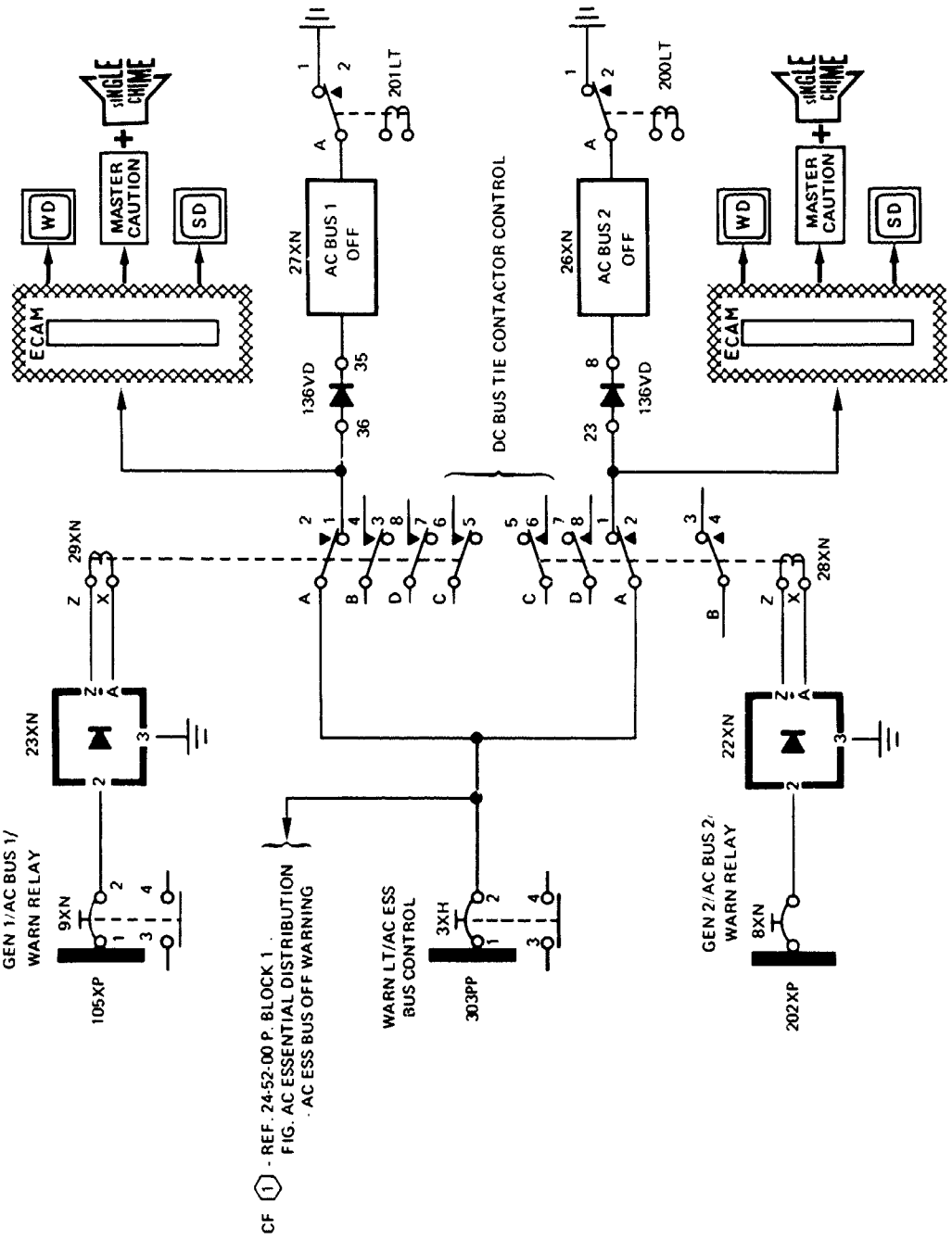
- AUXILEC type 700
- nominal rating power : 700VA
- output voltage
  . 27.1 ± 0.3V at no load
  . 26 ± 0.3V at nominal load and for a power factor comprised between 0.35 and 1.

Part of this network (210XP, 214XP, 215XP, 216XP, 217XP) can be supplied directly by the ground power unit in ground service configuration (Ref.24-50-00 P. Block 1 and Ref. 24-42-00 P. Block 1)
For each main busbar an amber light indicator AC BUS OFF and the corresponding warning on the ECAM system are activated to indicate a supply loss
(Ref. Fig. 006)

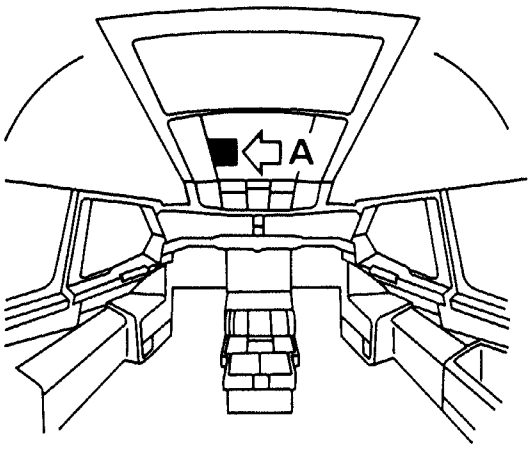
2. Component Location
(Ref. Fig. 007)
(Ref. Fig. 008)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
17XN	TRANSFORMER-NORM 115/26, SYS1		120	121BL	24-51-11
18XN	TRANSFORMER-NORM 115/26, SYS2		120	121BL	24-51-11
26XN	WARNING LIGHT-AC BUS 2 OFF	424VU	211		24-22-00
27XN	WARNING LIGHT-AC BUS 1 OFF	424VU	211		24-22-00
1XX	CNTOR-AC SERVICE BUS GND/NORM SPLY	101VU	121	121BL	24-42-11
2XX	CNTOR-AC SERVICE BUS GND/NORM SPLY	101VU	121	121BL	24-42-11
17XX	CNTOR-CARGO LOAD SYSTEM GND NORM SPLY	101VU	121	121BL	24-42-15
3XG	CNTOR-AC EXT PWR	101VU	121	121BL	24-41-12
3XS	CNTOR-APU GEN PWR LINE	101VU	121	121BL	24-23-13
9XU	CNTOR-GEN 1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN 2 LINE	101VU	121	121BL	24-22-15
11XU	CNTOR-TRANSFER, SYS 1	101VU	121	121BL	24-22-18
12XU	CNTOR-TRANSFER, SYS 2	101VU	121	121BL	24-22-18
11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11

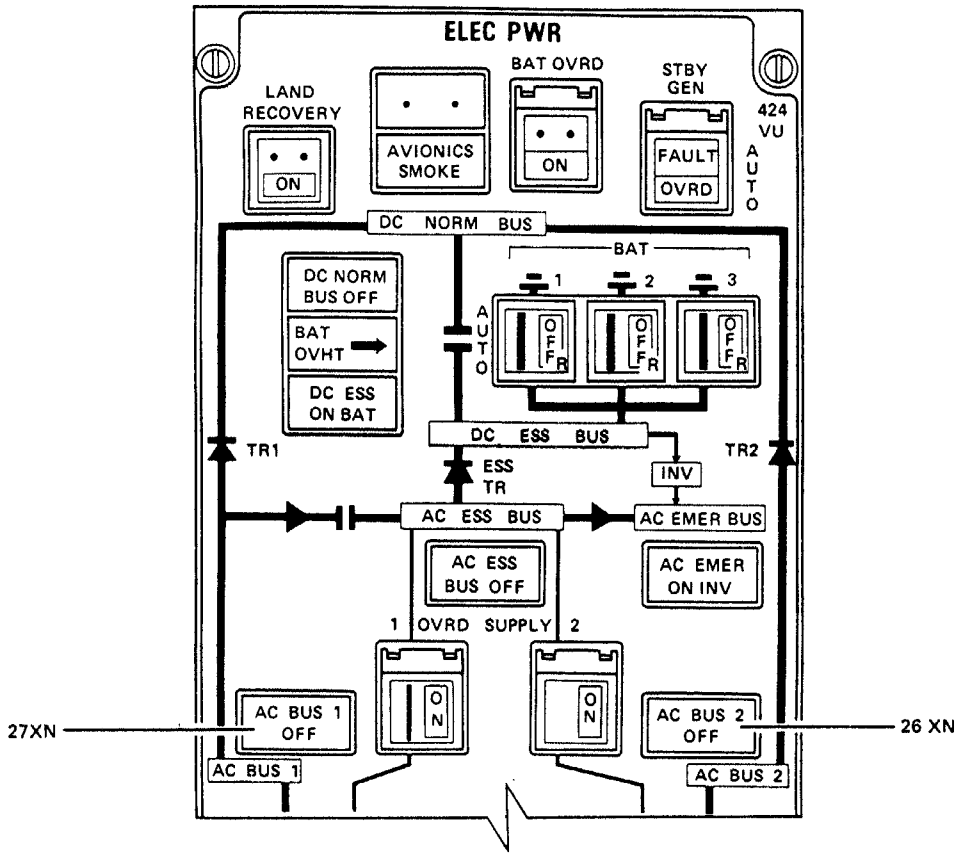


BM5 24 51 00 0 ACPO 13 07
DM5

AC Normal Distribution - AC NORM BUS OFF Warning
Figure 006

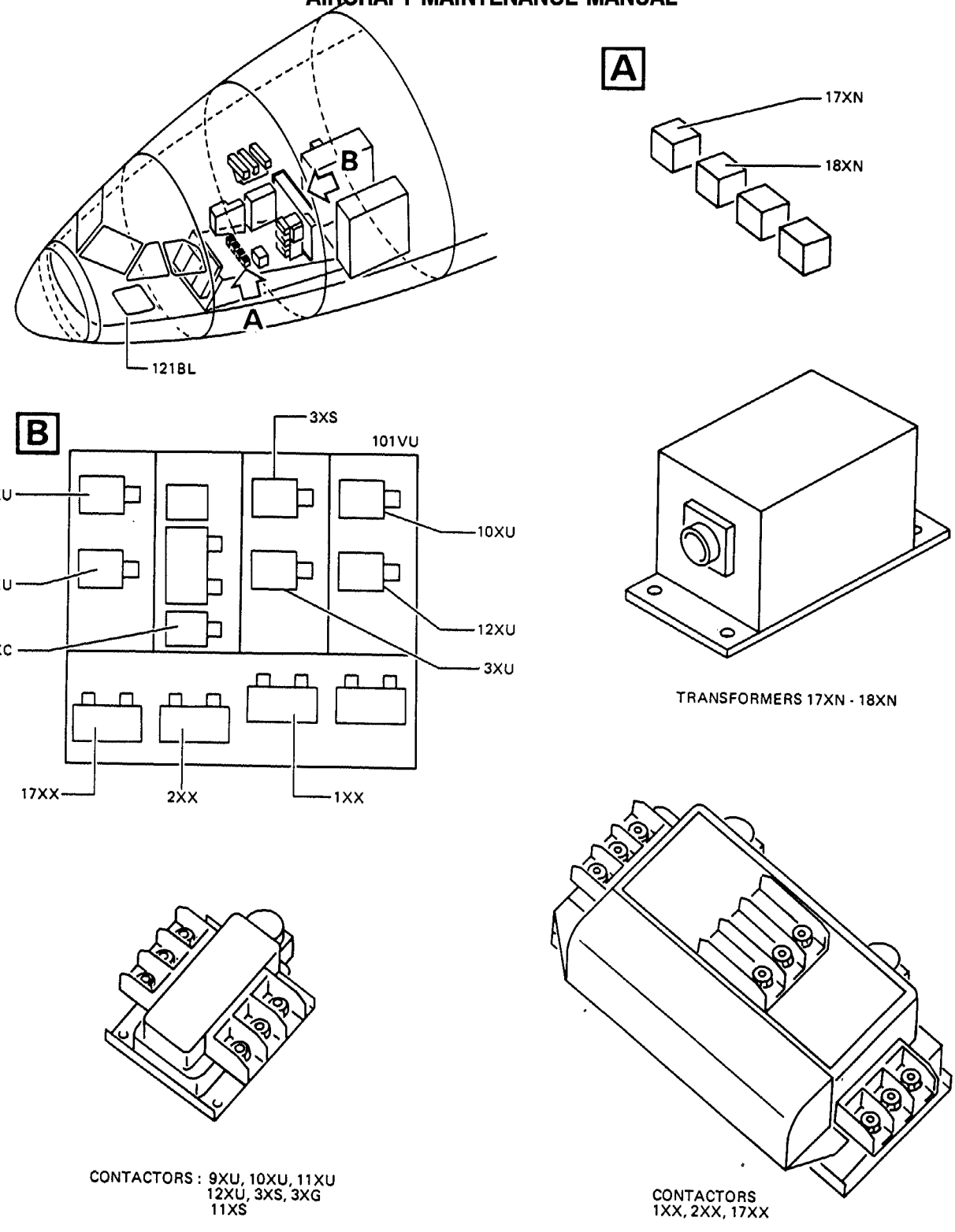


A



BM5 24 51 00 0 BERO-27-21
DM5

AC Normal Distribution - Control and Indicating - Location
Figure 007



BM5 24 51 00 0 BGMO - 17 - 13
DM5

AC Normal Distribution - Avionics Compartment - Location
Figure 008

115/26V NORMAL TRANSFORMER 17XN (18XN) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker Safety Clips

2. Procedure (Ref. Fig. 401)

A. Job Set-Up
(1)Open access door 121BL.
(2)Open, safety and tag the following circuit breakers :
(a)For 115/26V transformer 1 (17XN)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN1 131XP BUSBAR	7XN	C01

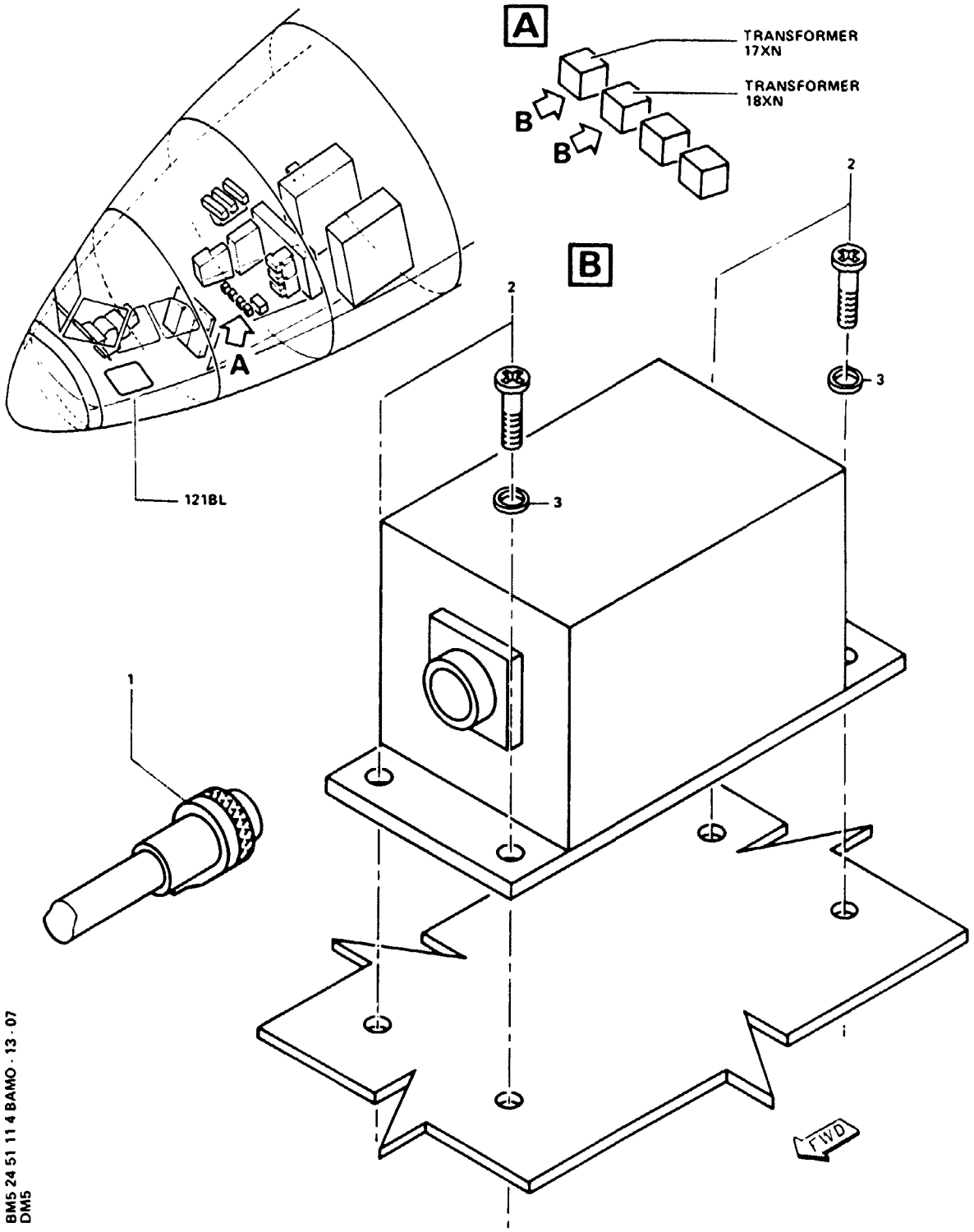
(b)For 115/26V transformer 2 (18XN)

PANEL	SERVICE	IDENT.	LOCATION
101VU	GEN2 231XP BUSBAR	6XN	C08

B. Removal
NOTE : Removal procedure is identical for transformers 17XN, 18XN.
(1)Disconnect and cap electrical connector (1)
(2)Remove screws (2) and washers (3).
(3)Remove transformer from its support.

C. Installation
NOTE : Installation procedure is identical for transformers 17XN, 18XN.
(1)Position transformer on its support.
(2)Install washers (3), screws (2) and tighten.
(3)Remove protective cap and connect electrical connector (1).

D. Close-Up
(1)Remove safety clips and tags and close circuit breakers 7XN and 6XN.
(2)Close access door 121BL.



115/26V Transformer - Normal
Figure 401

1. General

R **ON A/C 001-003,

(Ref. Fig. 001)

R **ON A/C ALL

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 002)

R **ON A/C ALL

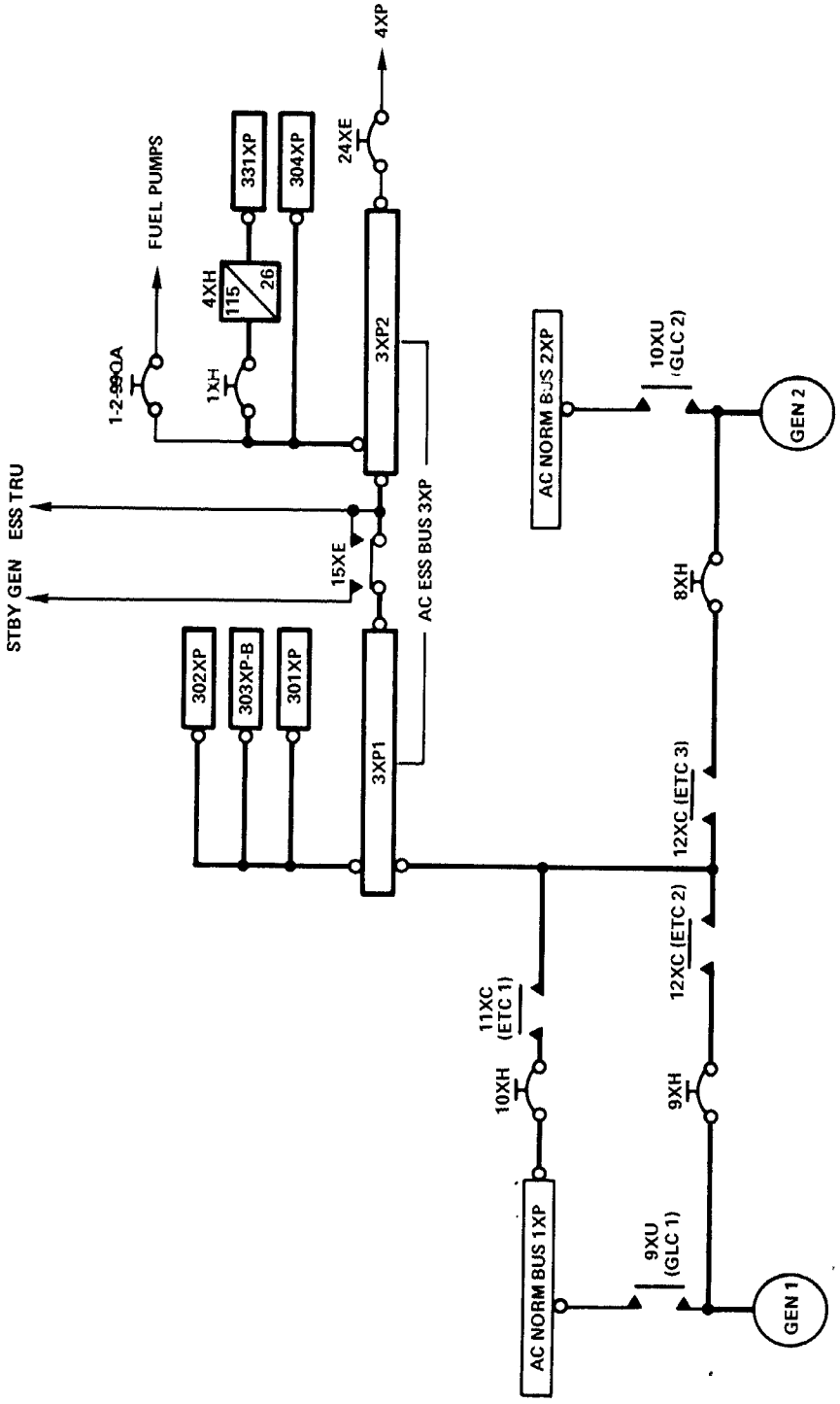
The AC essential distribution network corresponds to busbar 3XP and the associated sub-busbars
It can be supplied :
- either by main busbar 1XP
- or directly by one of the two generators, upstream of its line contactor.

Part of the essential busbar (3XP-2 and its associated sub-busbars) is supplied by the standby generator in emergency configuration.
(Ref. 24-53-00, P. Block 1).
The major part of this network is in 115V/400hz three phase.
A 115/26V single phase autotransformer, identical to those of the normal distribution (Ref. 24-51-00, P. Block 1) supplies an essential 26V/400hz sub-busbar (331XP).
The amber AC ESS BUS OFF warning light and the corresponding warning on the ECAM display units are activated to indicate a supply loss
(Ref. Fig. 003)

2. Component Location

(Ref. Fig. 004)
(Ref. Fig. 005)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11
12XC	CNTOR-ESS BUS GEN1/2 SUPPLY	101VU	121	121BL	24-25-11
15XE	CNTOR-AC STANBY	101VU	121	121BL	24-24-55
4XH	TRANSFORMER-ESS 115/26		120	121BL	24-52-11
7XH	WARNING LIGHT-AC ESS BUS OFF	424VU	211		24-52-00
9XU	CNTOR-GEN1 LINE	101VU	121	121BL	24-22-15
10XU	CNTOR-GEN2 LINE	101VU	121	121BL	24-22-15



BM5 24 52 00 0 BAMO - 17 - 12
DM5

AC Essential Distribution - AC Essential Load Distribution
Figure 001

R EFFECTIVITY: 001-003,

PIA

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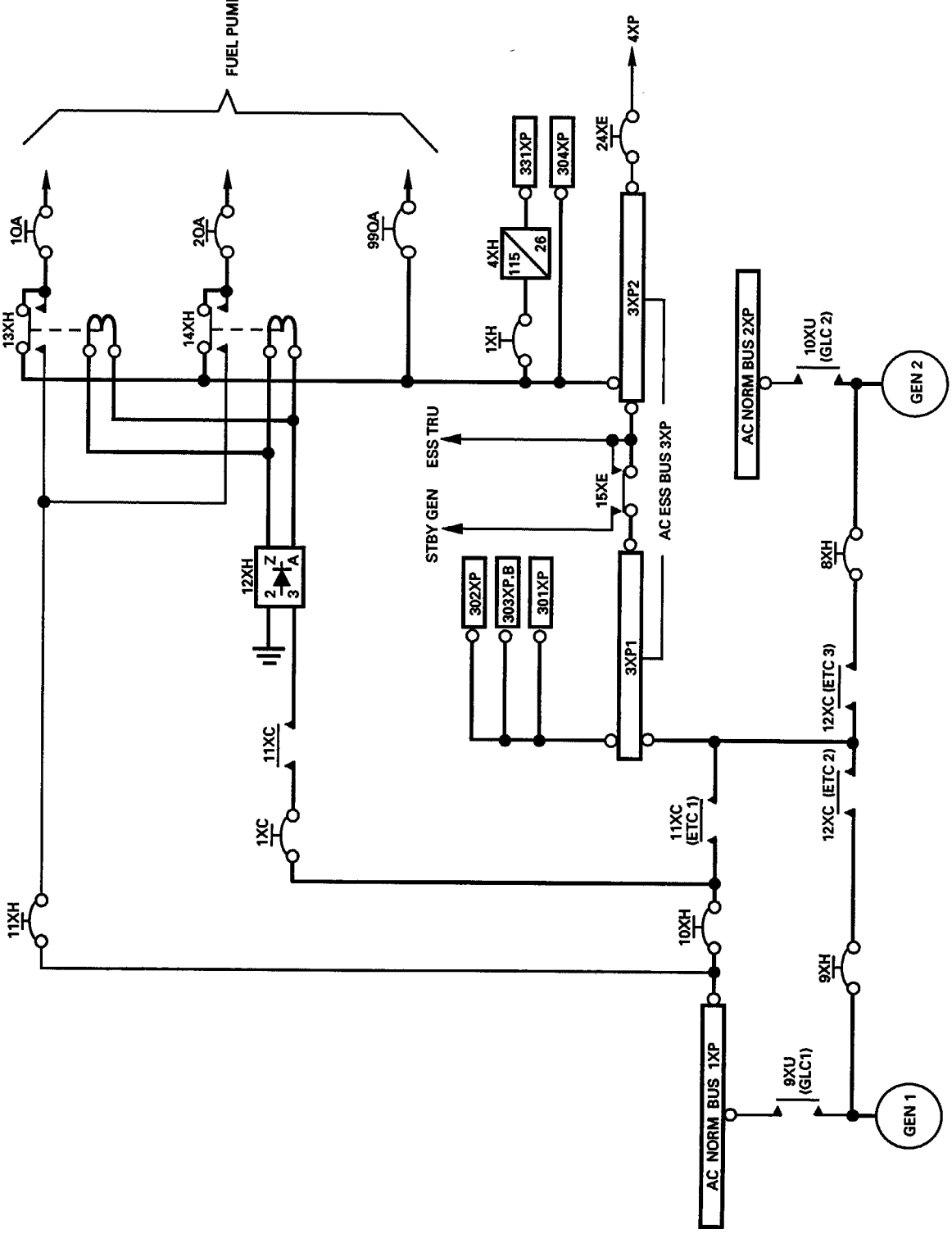
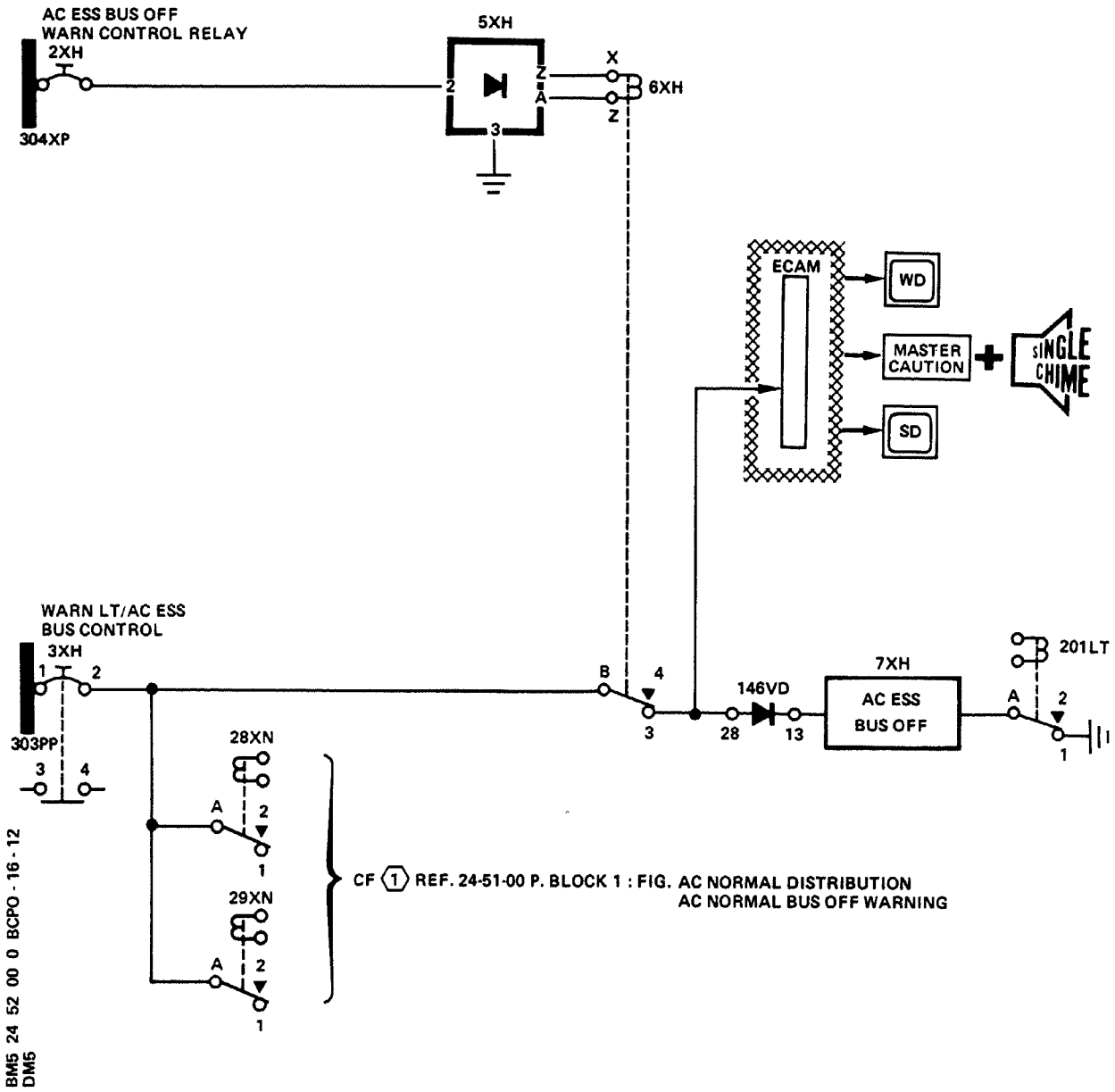
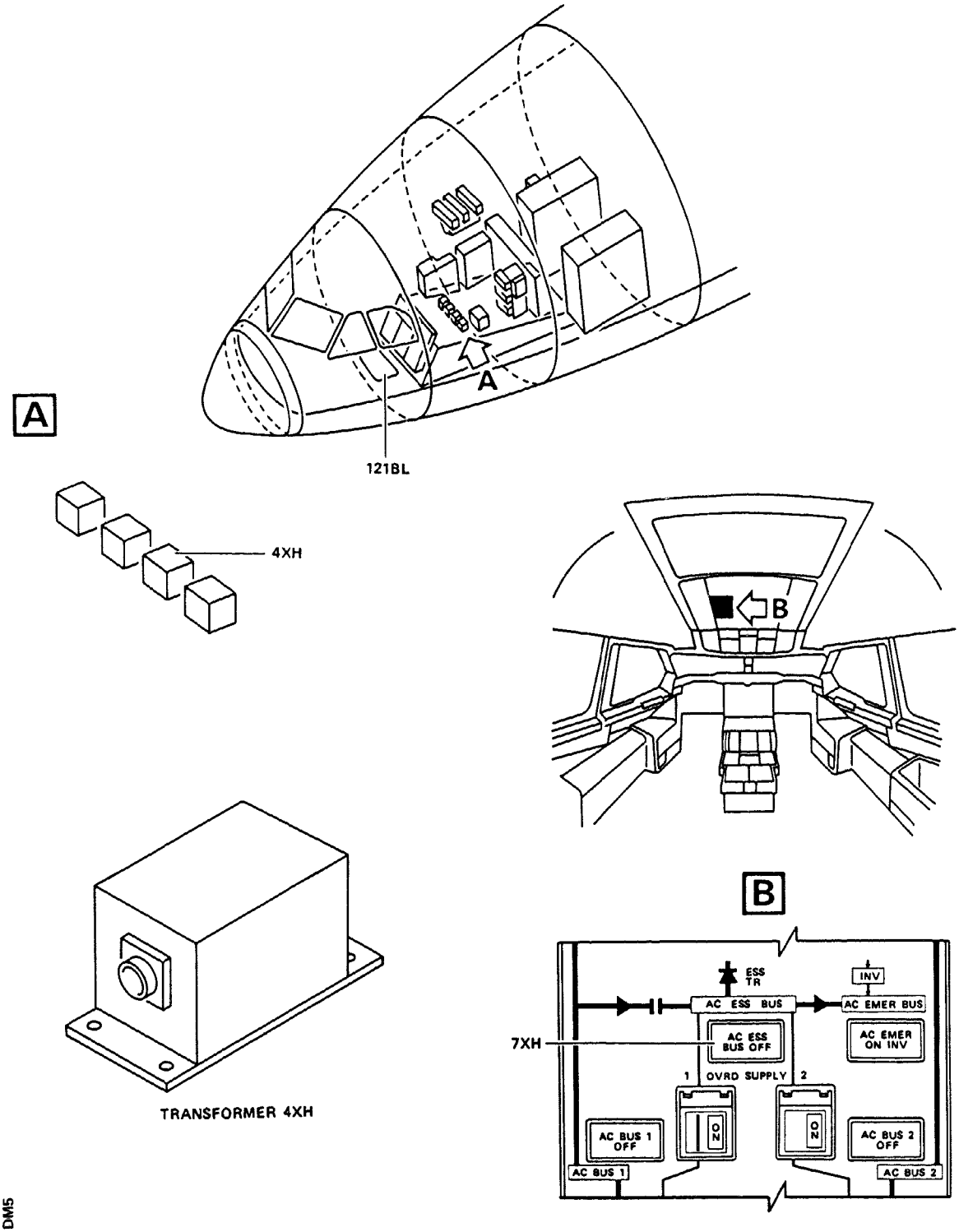


AC Essential Distribution - AC Essential Load Distribution
Figure 002

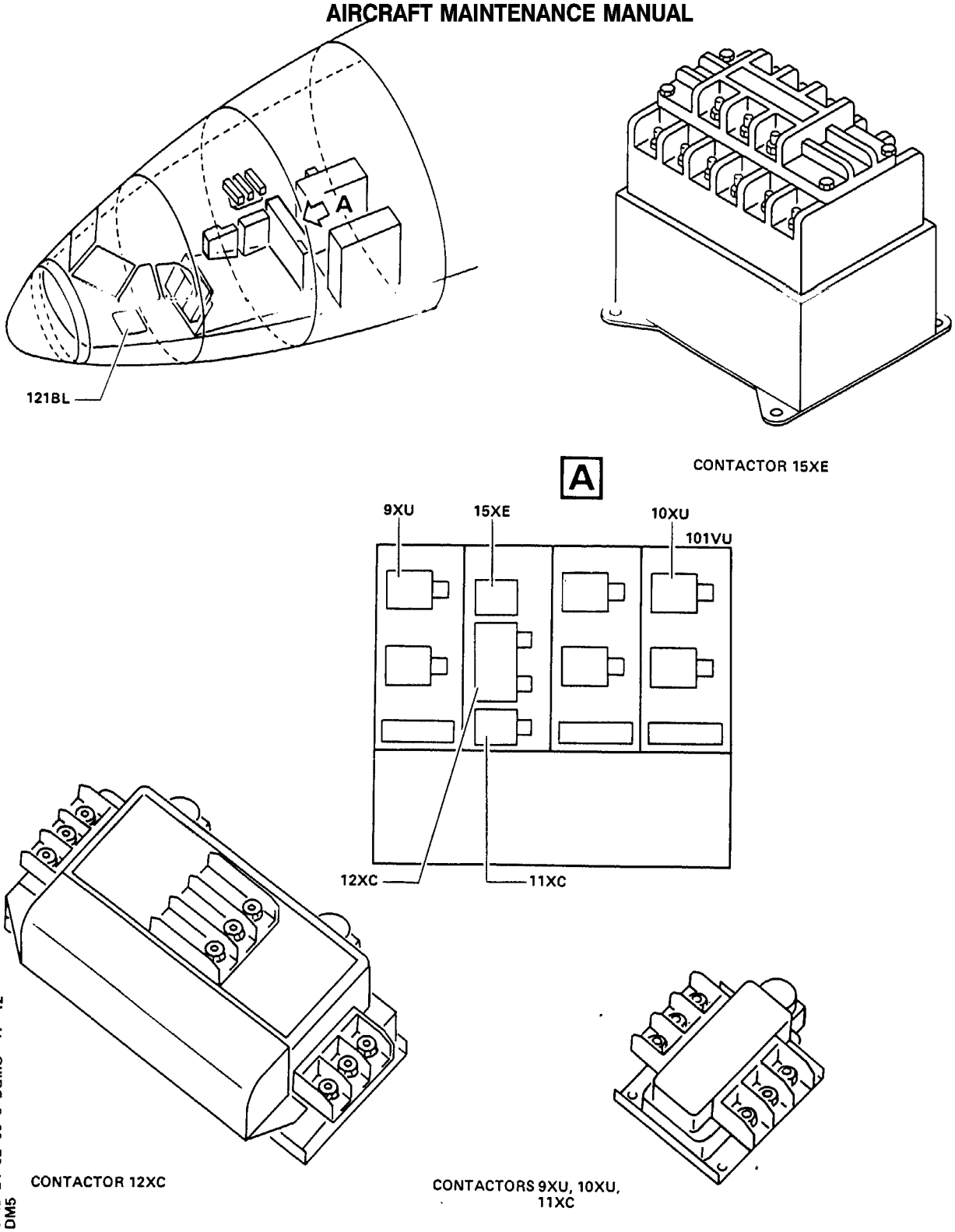


AC Essential Bus Supply Indication
Figure 003



BM5 24 52 00 0 TEMO · 12 · 07
DM5

AC Essential Distribution - Component Location
Figure 004



BM5 24 52 00 0 BGMO · 17 · 12
DM5

AC Essential Distribution - Component Location
Figure 005

115/26V ESSENTIAL TRANSFORMER 4XH - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker Safety Clips

2. Procedure (Ref. Fig. 401)

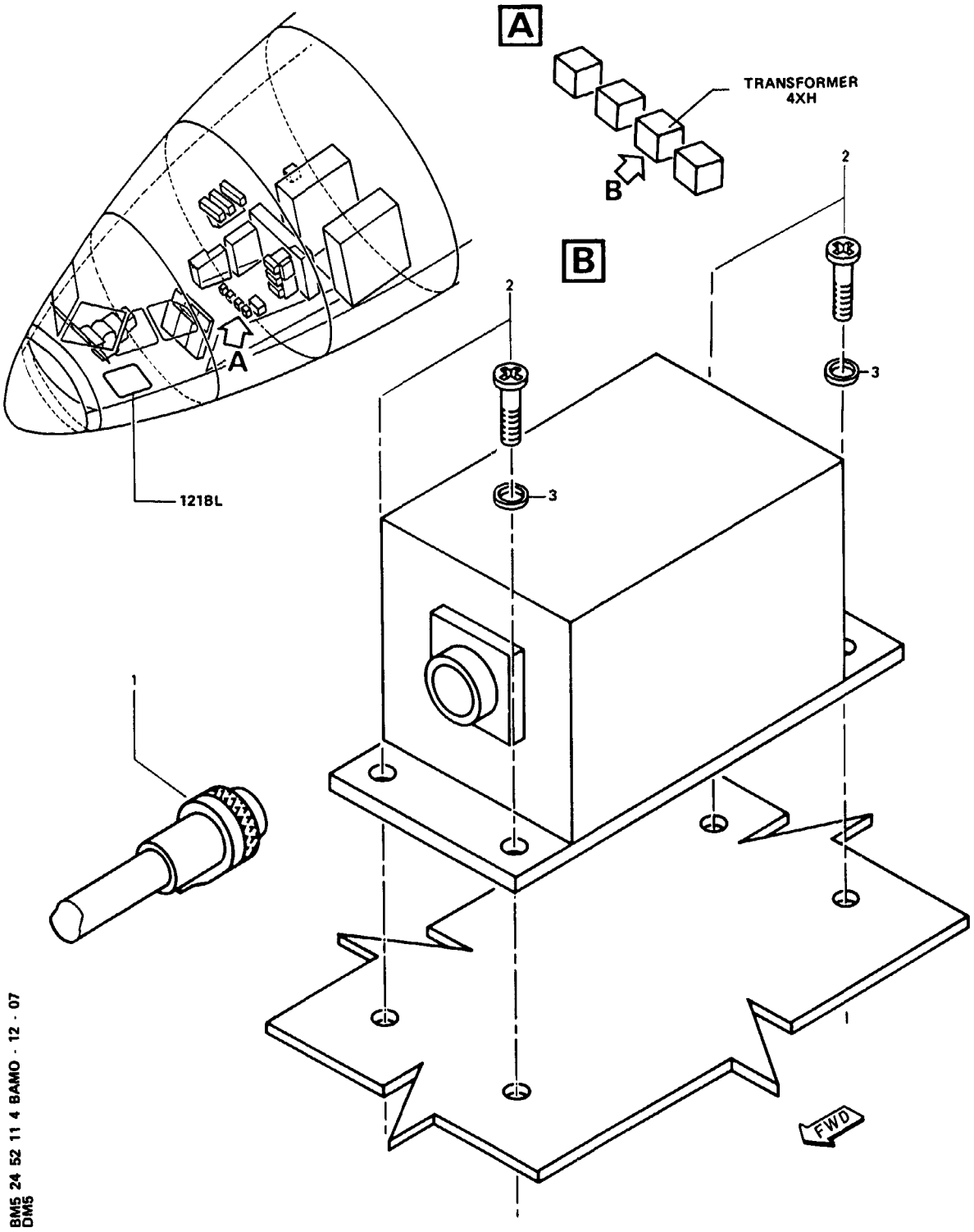
A. Job Set-Up
  (1)Open access door 121BL.
  (2)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
101VU	AC ESS PWR/SUPPLY 331XP BUSBAR	1XH	A07

B. Removal
  (1)Disconnect and cap electrical connector (1)
  (2)Remove screws (2) and washers (3).
  (3)Remove transformer from its support.

C. Installation
  (1)Position transformer on its support.
  (2)Install washers (3), screws (2) and tighten.
  (3)Remove protective cap and connect electrical connector (1).

D. Close-Up
  (1)Remove safety clips and tags and close circuit breaker 1XH.
  (2)Close access door 121BL.



115/26V Essential Transformer
Figure 401

1. General

R **ON A/C 001-003,

(Ref. Fig. 001)

R **ON A/C ALL

R Post SB 24-2041 For A/C 001-003,

(Ref. Fig. 002)

R **ON A/C ALL

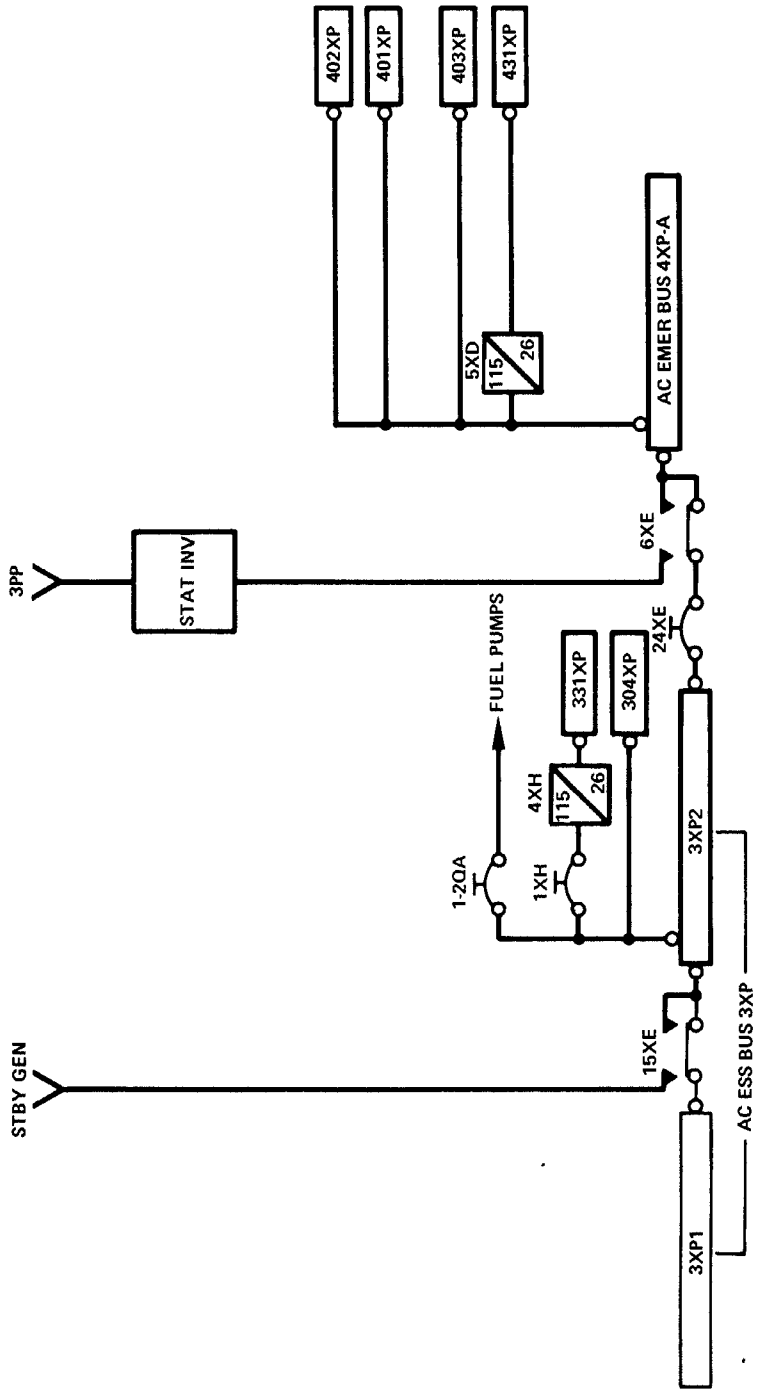
(Ref. Fig. 003)
The emergency AC distribution corresponds to 2 networks.

A. Static Inverter or Essential Busbar Supply
The network corresponds to busbar 4XP and associated sub-busbars.
The major part of the network is 115 V/400 Hz, single phase.
A 115/26 V autotransformer supplies the 26 V/400 Hz sub-busbar 431XP.
Characteristics :
- AUXILEC type 152
- nominal power : 150VA
- output voltage
  . 27.1 ± 0.3 V at no load
  . 26 ± 0.3 V at nominal load and for a power factor comprised between 0.35 and 1.

AC EMER ON INV Blue indicator light comes on to indicate that the network is supplied by the static inverter.

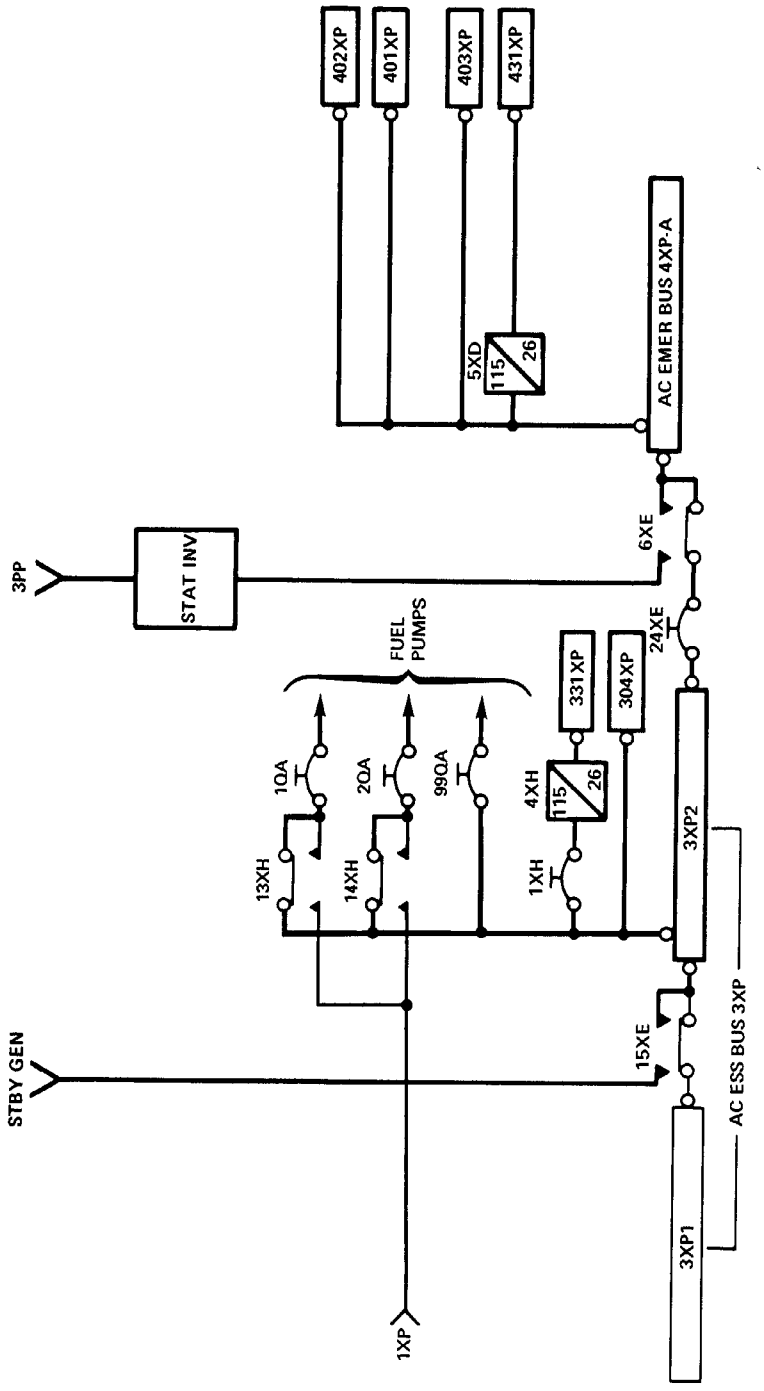
B. Standby Generator Supply
The network corresponds to busbars 3XP2, 4XP and associated sub-busbars.
The major part of the network is 115 V/400 Hz, three-phase.
A 115/26 V autotransformer supplies the sub-busbar 431XP (see para. 1.A.).
A second 115/26 V autotransformer, identical to those of the normal distribution (Ref. 24-51-00, P. Block 1) supplies sub-busbar 331XP.
AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights come on and AC ESS BUS OFF, DC ESS ON BAT warning lights and AC EMER ON INV indicator light go off on ELEC PWR panel 424VU to indicate that the network is supplied by the standby generator.

2. Component Location
(Ref. Fig. 004, 005)



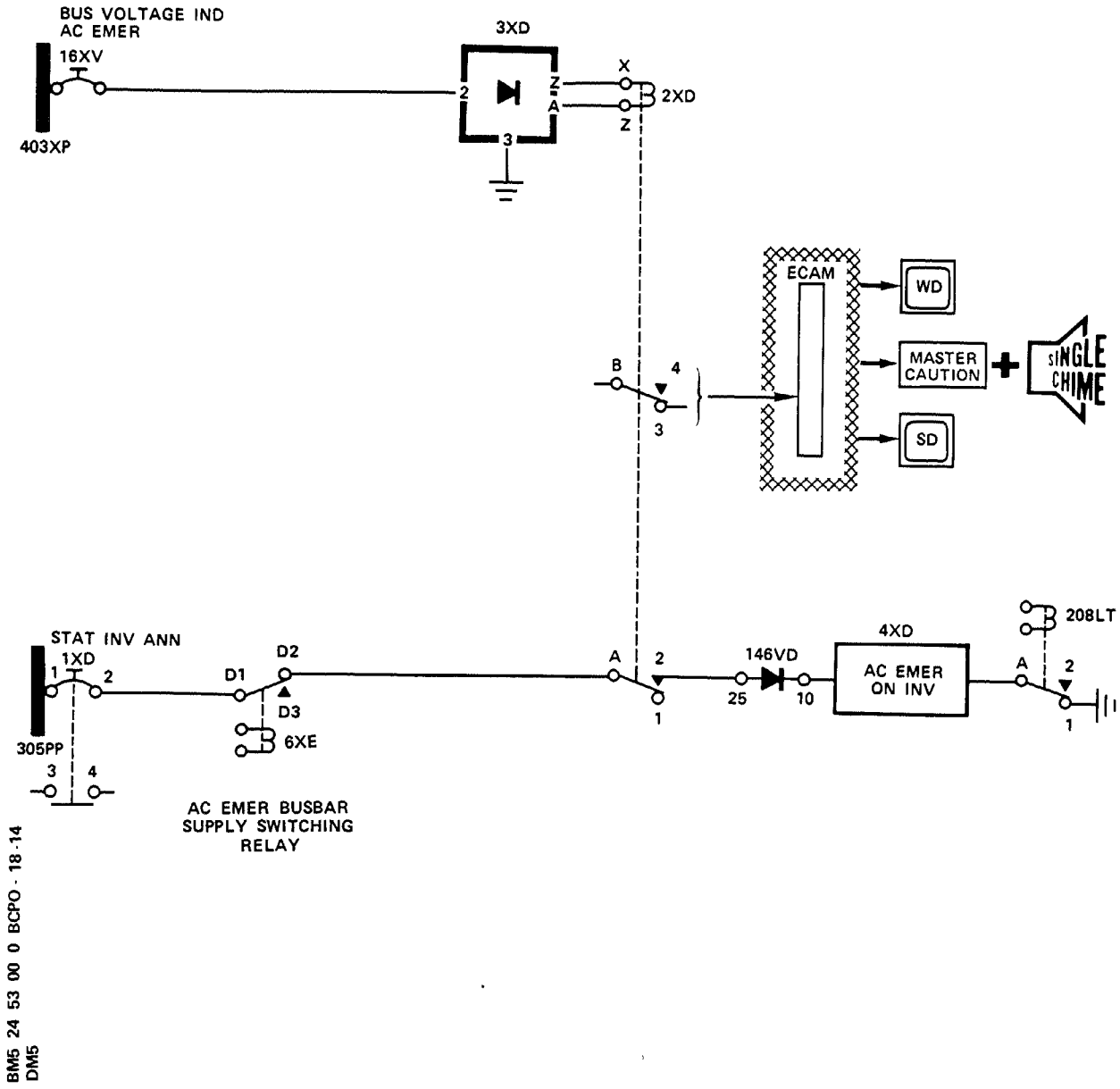
BM5 24 53 00 0 BAMO - 17 - 12
DM5

Emergency AC Distribution - AC Emergency Load Distribution
Figure 001

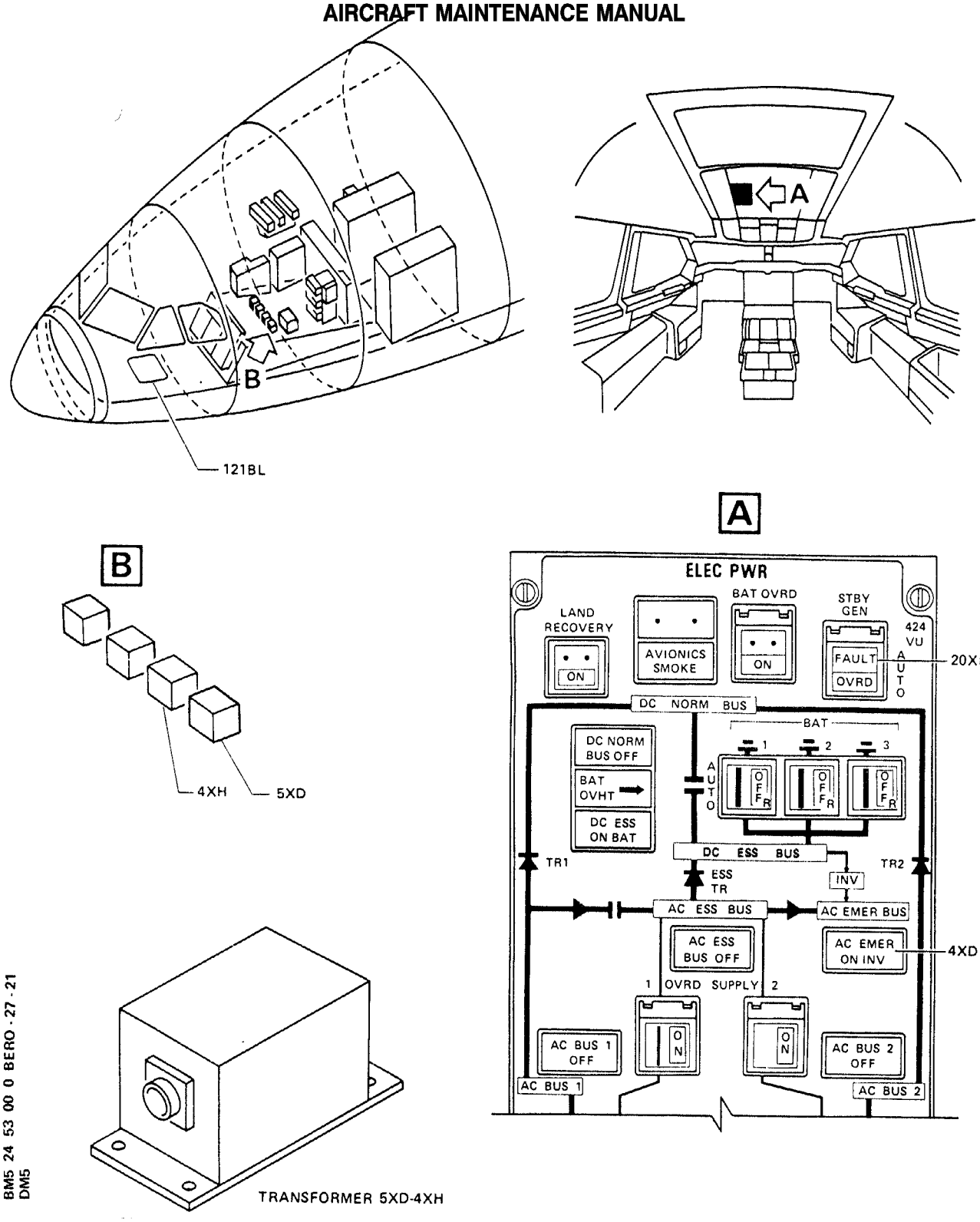


BM5 24 53 00 0 BANO - 02

Emergency AC Distribution - AC Emergency Load Distribution
Figure 002

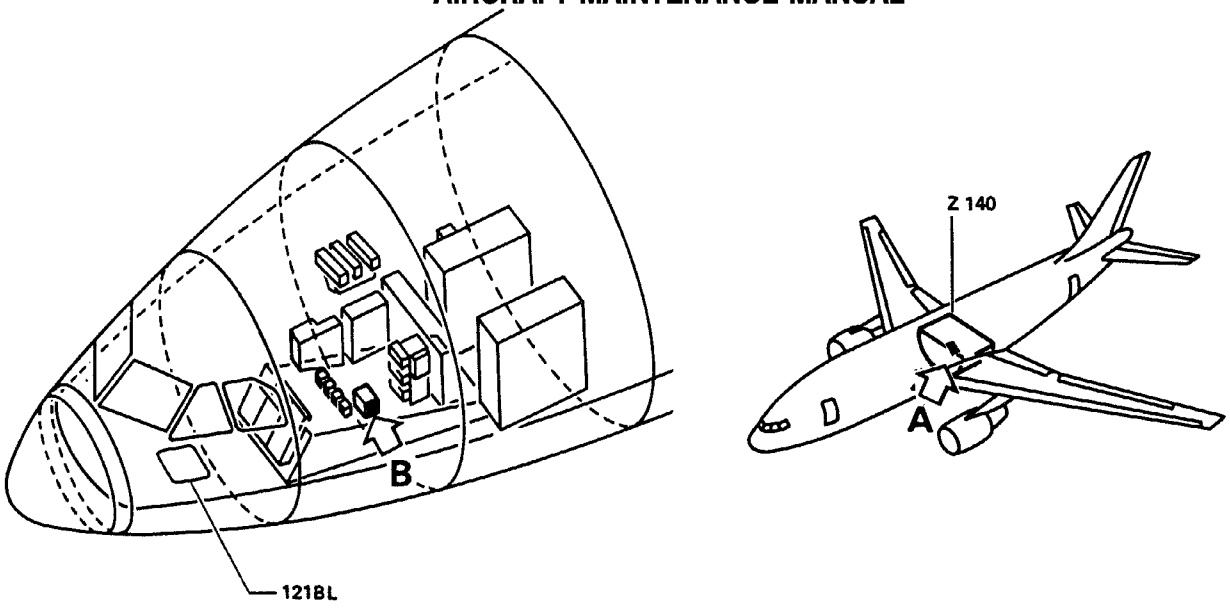


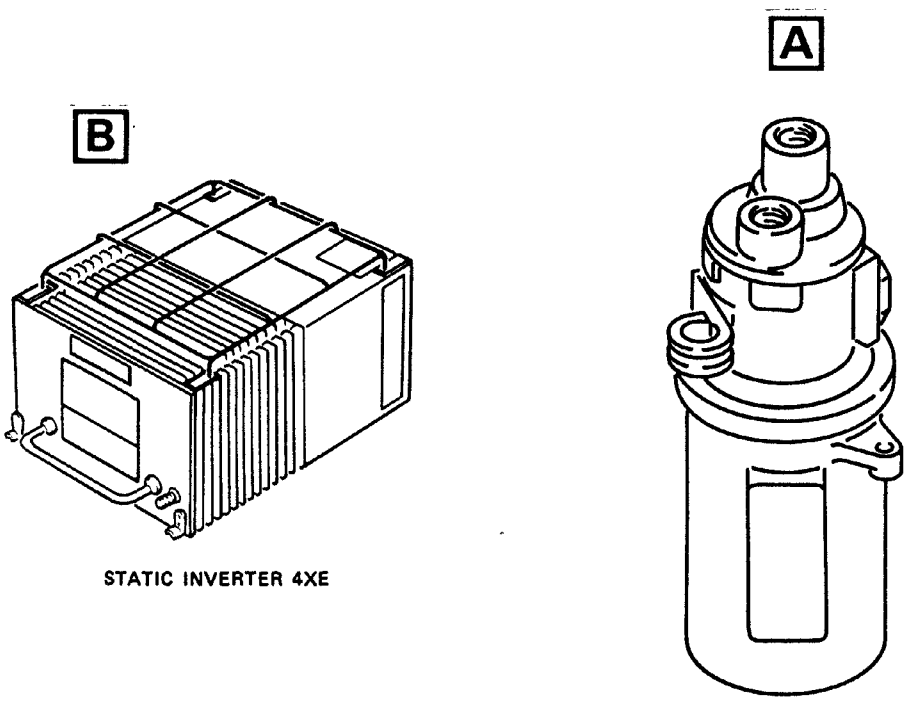
Emergency AC Distribution - AC Emergency
Bus Supply Indication
Figure 003



BM5 24 53 00 0 BERO · 27 · 21
DM5

AC Emergency Distribution - Component Location
Figure 004





STATIC INVERTER 4XE

AC/DC STAND BY GENERATOR 25XE

BM5 24 53 00 0 BFMO-16-12
DM5

AC Emergency Distribution - Component Location
Figure 005

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
4XD	INDICATOR LIGHT-AC EMER ON INV	424VU	211		24-24-00
5XD	TRANSFORMER-EMER 115/26		120	121BL	24-53-11
4XE	STATIC INVERTER		120	121BL	24-24-11
20XE	P/BSW-STBY GEN	424VU	211		24-24-00
25XE	GENERATOR-STANDBY		140		24-24-51
4XH	TRANSFORMER-ESS 115/26		120	121BL	24-52-11

EMERGENCY TRANSFORMER 5XD - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Plugs/Caps
B.	Circuit Breaker Safety Clips

2. Procedure (Ref. Fig. 401)

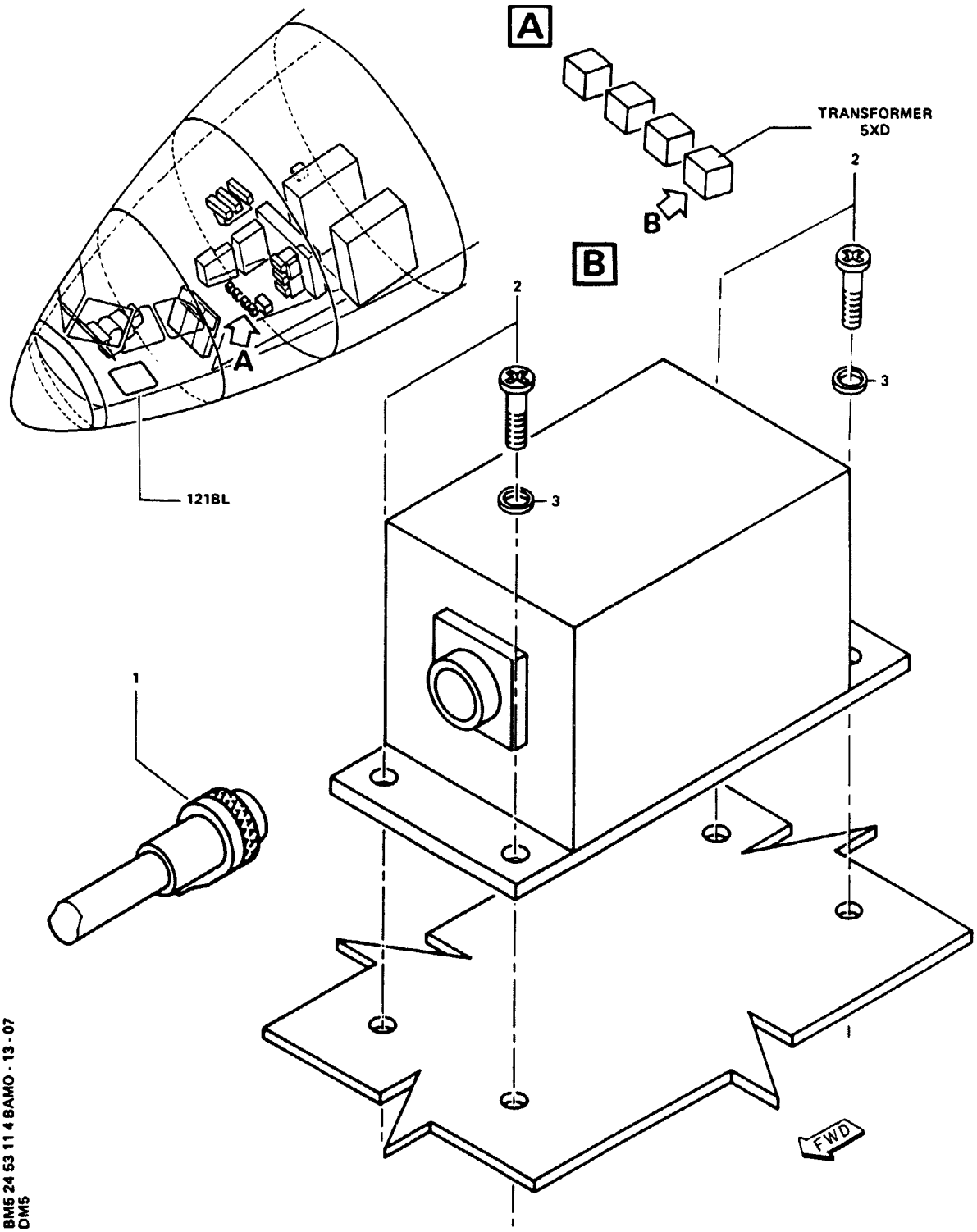
A. Job Set-Up
(1)Open access door 121BL.
(2)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
101VU	AC ESS PWR/AC EMER BUS	24XE	A04
133VU	ELEC/FUELLING SUPPLY BAT 1	3PR	334/S80
133VU	ELEC/STAT INV CTL	1XE	333/T79

B. Removal
(1)Disconnect and cap electrical connector (1).
(2)Remove screws (2) and washers (3).
(3)Remove transformer from its support.

C. Installation
(1)Position transformer on its support.
(2)Install washers (3), screws (2) and tighten.
(3)Remove protective cap and connect electrical connector (1).

D. Close-Up
(1)Remove safety clips and tags and close circuit breakers 24XE, 1XE and 3PR.
(2)Close access door 121BL.



Emergency Transformer
Figure 401

DC NORMAL DISTRIBUTION

1. General

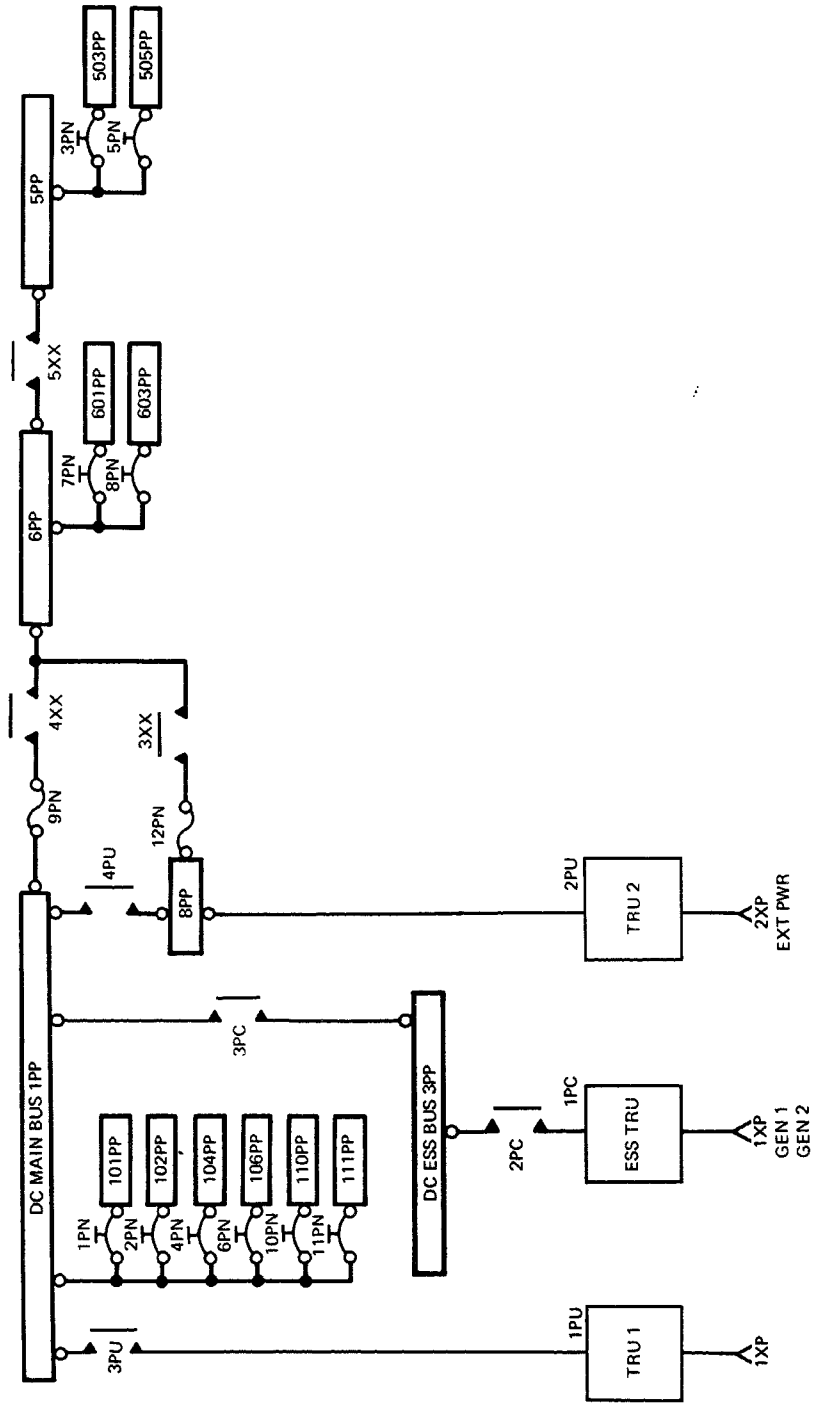
The normal 28VDC distribution network corresponds to busbars 1PP, 5PP, 6PP and to the associated sub-busbars
(Ref. Fig. 001)
The network can be supplied.
- either by TR1 only or TR2 only
- or by TR1 and TR2
- or by TR1 and essential TR (via busbar 3PP)
- or by TR2 and essential TR (via busbar 3PP)
- or by TR1, TR2 and essential TR (via busbar 3PP)

Busbar 6PP is supplied in flight and/or on the ground.
Busbar 5PP is supplied on the ground only (automatically just after landing)
These two busbars can be supplied, independently from the main network, by the ground power unit via TR2 in ground service configuration (Ref. 24-50-00 P. Block 1 and Ref. 24-42-00, P. Block 1)
Amber light indicator DC NORM BUS OFF and the associated warning on the ECAM system are activated to indicate a supply loss
(Ref. Fig. 002)

2. Component Location

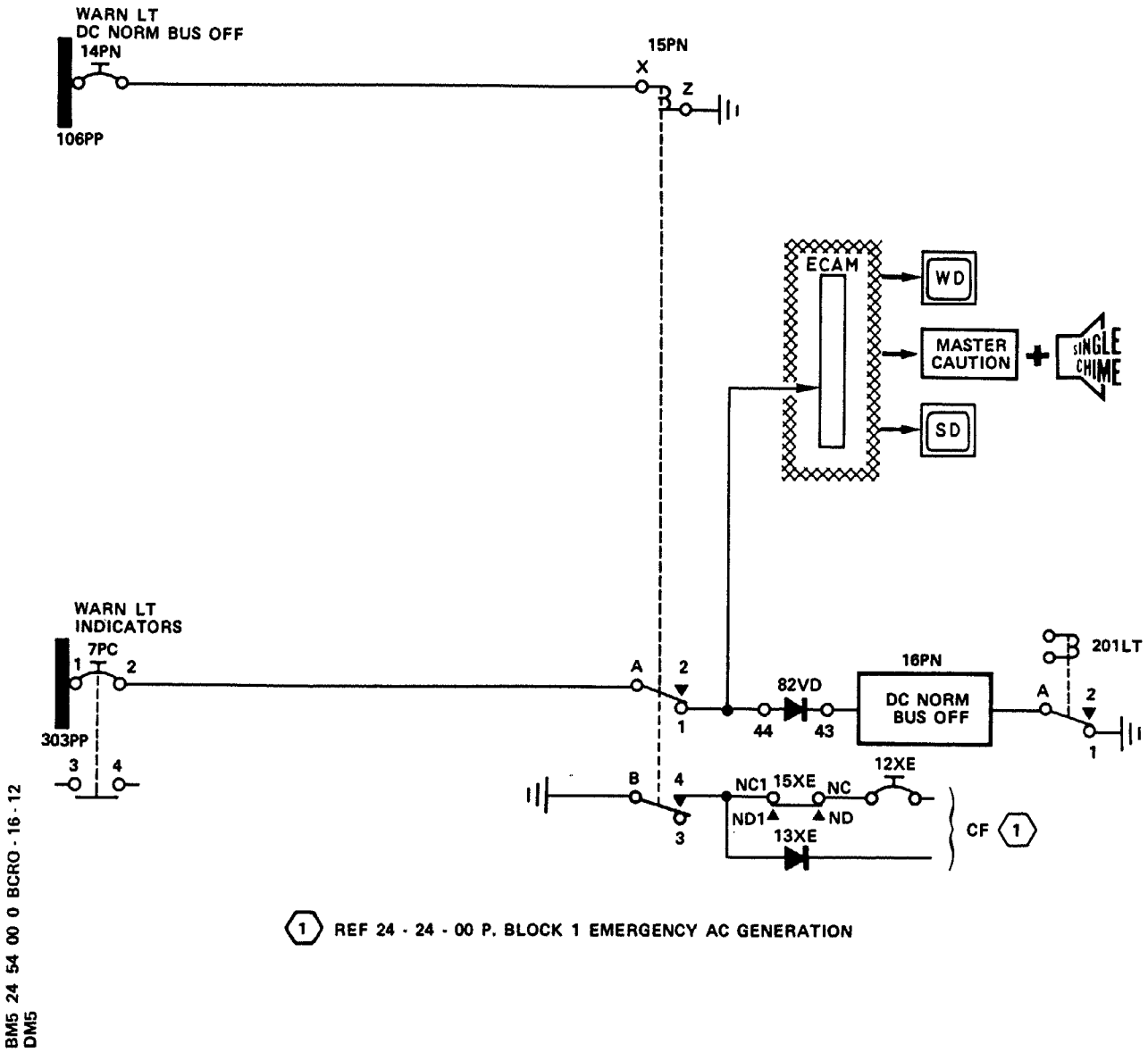
(Ref. Fig. 003)
(Ref. Fig. 004)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
	1PC	TRANSFORMER RECT-ESS		122	121BL	24-32-11
	2PC	CNTOR-ESS TR	106VU	122	121BL	24-35-00
	3PC	CNTOR-DC BUS TIE	106VU	122	121BL	24-35-00
	16PN	WARNING LIGHT-DC NORM BUS OFF	424VU	211		24-32-00
	1PU	TRANSFORMER RECT-1		122	121BL	24-32-11
	2PU	TRANSFORMER RECT-2		122	121BL	24-32-11
R	3PU	CNTOR-TR1	106VU	122	121BL	24-32-17
R	4PU	CNTOR-TR2	106VU	122	121BL	24-32-17
	3XX	CNTOR-DC SERVICE BUS GND SUPPLY	106VU	121	121BL	24-54-00
	4XX	CNTOR-DC SERVICE BUS NORMAL SUPPLY	106VU	121	121BL	24-54-00
	5XX	CNTOR-DC SERVICE BUS GROUND SUPPLY	106VU	121	121BL	24-54-00



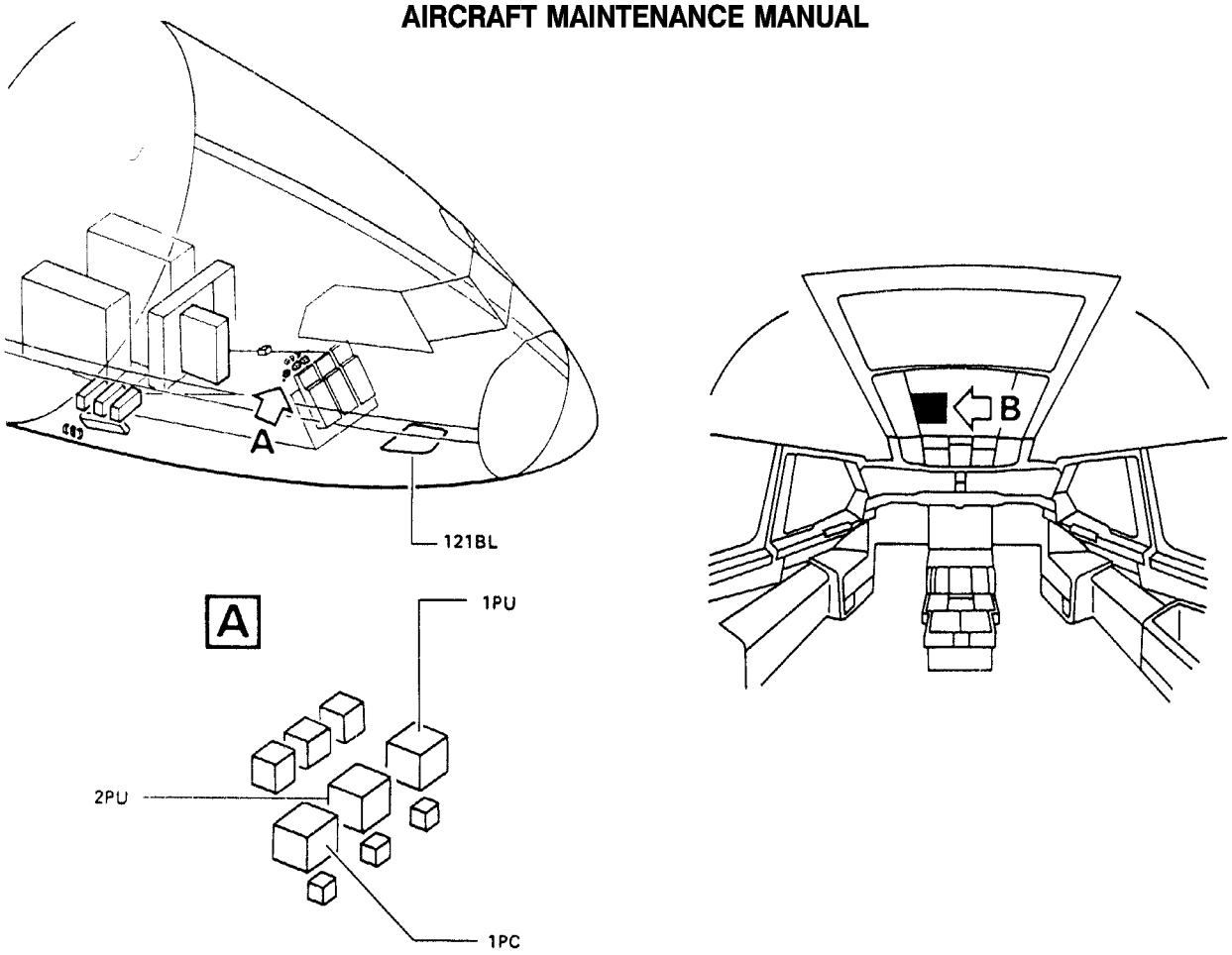
BM5 24 54 00 0 AAMO 07 02
DM5

DC Normal Distribution - DC Normal Load Distribution
Figure 001



(1) REF 24 - 24 - 00 P. BLOCK 1 EMERGENCY AC GENERATION

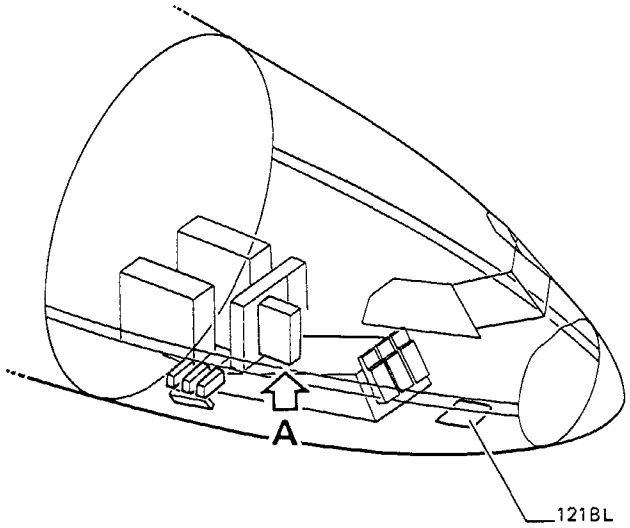
DC Normal Distribution - DC NORM BUS warning
Figure 002

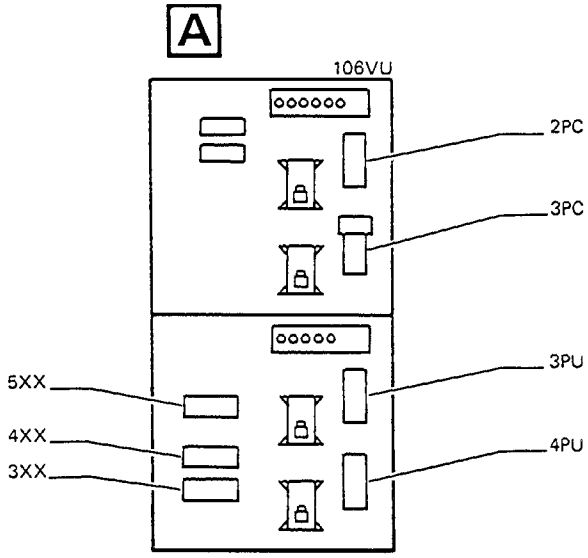


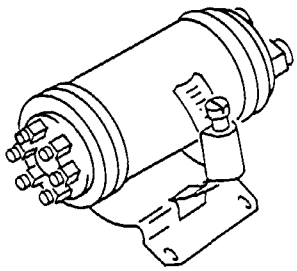
TRANSFORMER RECTIFIERS
1PC- 1PU- 2PU

BM5 24 54 00 0 BERO -27 -21
DM5

DC Normal Distribution - Component Location
Figure 003







CONTACTORS
2PC, 3PC, 4PU, 3PU
3XX, 4XX, 5XX

BM5 24 54 00 0 AGMO 08 03
DM5

DC Normal Distribution - Component Location
Figure 004

DC ESSENTIAL DISTRIBUTION

1. General

The essential 28VDC distribution network corresponds to busbar 3PP and associated sub busbars
(Ref. Fig. 001)
It can be supplied :
- either by the essential TR
- or by busbar 1PP (in fact, by TR1 and/or 2)
- or by any combination of these three sources in parallel according to their availability
- or by the standby generator
- or, finally, by the batteries only

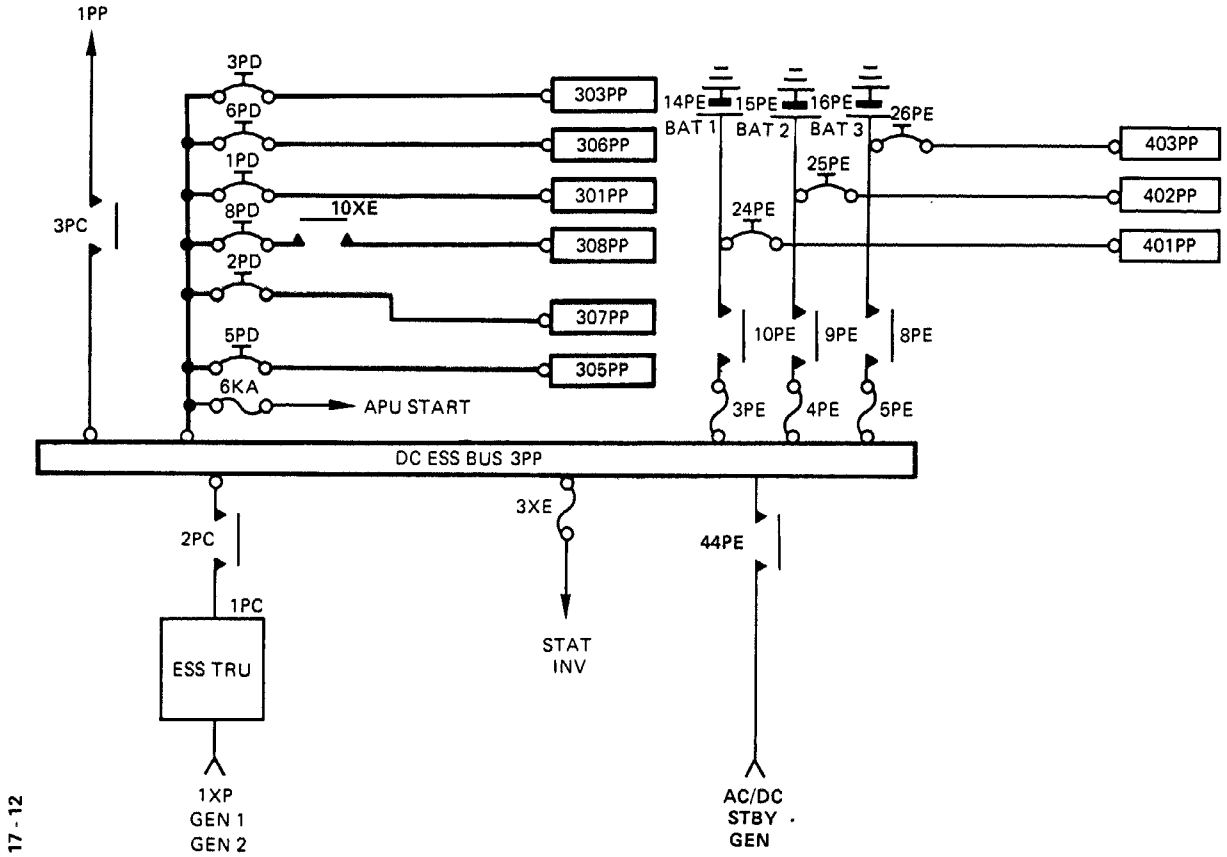
R In emergency configuration by batteries, part of that network is shed (Ref. 24-50-00, P. Block 1).

R DC ESS ON BAT amber warning light comes on, to indicate that the network is
R only supplied by the batteries.
(Ref. Fig. 002)

2. Component Location

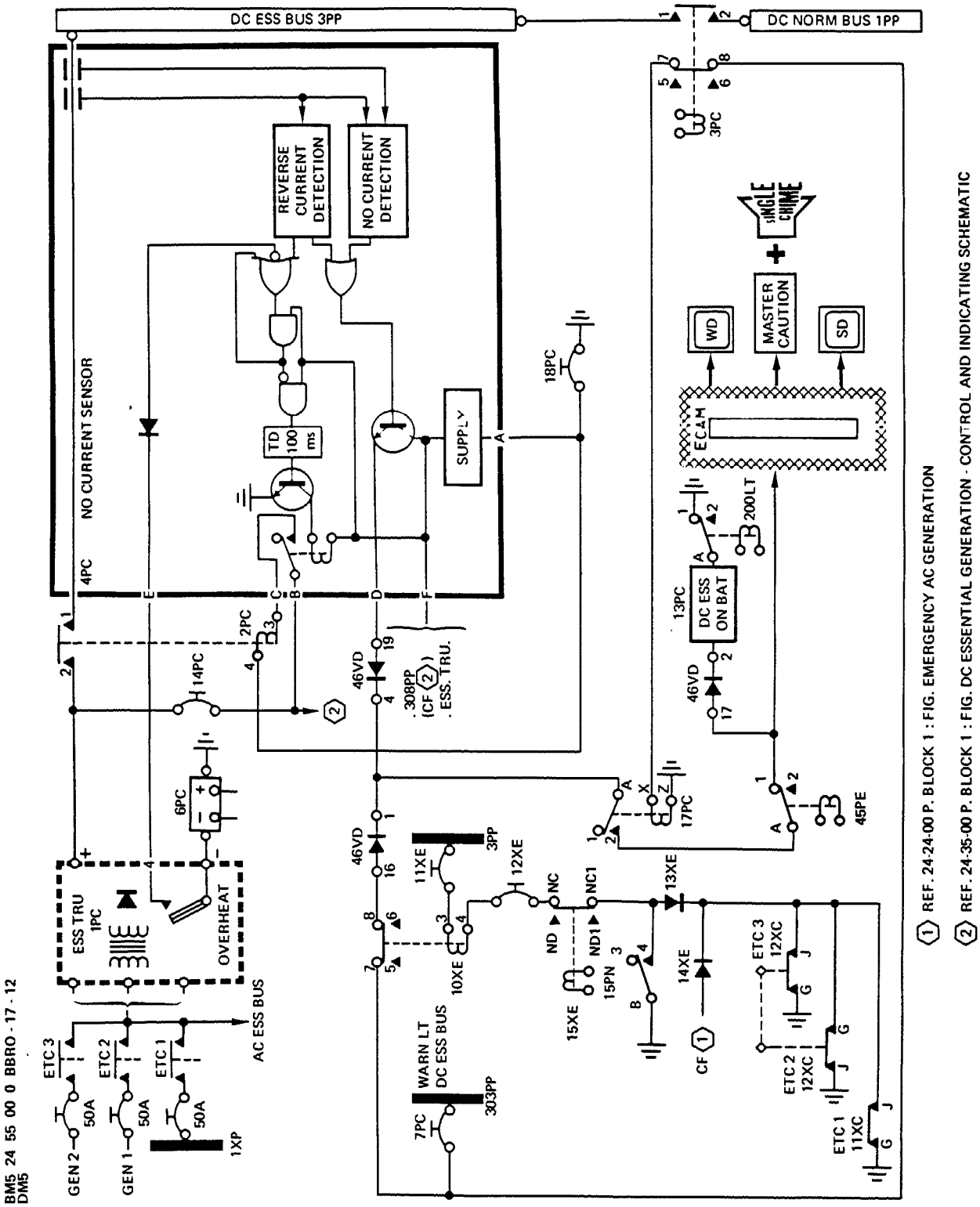
(Ref. Fig. 003)
(Ref. Fig. 004, 005, 006)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
1PC	TRANSFORMER RECT-ESS		122	121BL	24-32-11
2PC	CNTOR-ESS TR	106VU	122	121BL	24-35-00
3PC	CNTOR-DC BUS TIE	106VU	122	121BL	24-35-00
4PC	SENSOR-NO DC/REV DC ESS TR	106VU	122	121BL	24-32-12
6PC	SHUNT-ESS TR		122	121BL	24-35-00
13PC	WARNING LIGHT-DC ESS ON BAT	424VU	211		24-35-00
3PE	FUSE-BAT 1	106VU	122	121BL	24-31-00
4PE	FUSE-BAT 2	106VU	122	121BL	24-31-00
5PE	FUSE-BAT 3	106VU	122	121BL	24-31-00
8PE	CNTOR-BAT 1	281VU	122	121BL	24-31-00
9PE	CNTOR-BAT 2	281VU	122	121BL	24-31-00
10PE	CNTOR-BAT 3	281VU	122	121BL	24-31-00
14PE	BATTERY 1		122	121BL	24-31-11
15PE	BATTERY 2		122	121BL	24-31-11
16PE	BATTERY 3		122	121BL	24-31-11
44PE	CNTOR-DC STANDBY	106VU	122	121BL	24-31-00
11XC	CNTOR-ESS BUS NORM SUPPLY	101VU	121	121BL	24-25-11
12XC	CNTOR-ESS BUS GEN 1/2 SUPPLY	101VU	121	121BL	24-25-11
3XE	FUSE-STATIC INV SUPPLY	106VU	122	121BL	24-55-00
4XE	STATIC INVERTER		120	121BL	24-24-11
10XE	CNTOR-308PP EMER SHED	106VU	122	121BL	24-55-00
15XE	CNTOR-AC STANDBY	101VU	121	121BL	24-24-55
25XE	AC/DC STANDBY GENERATOR		140		24-24-51



BM5 24 55 00 0 8AMO 17 12
DM5

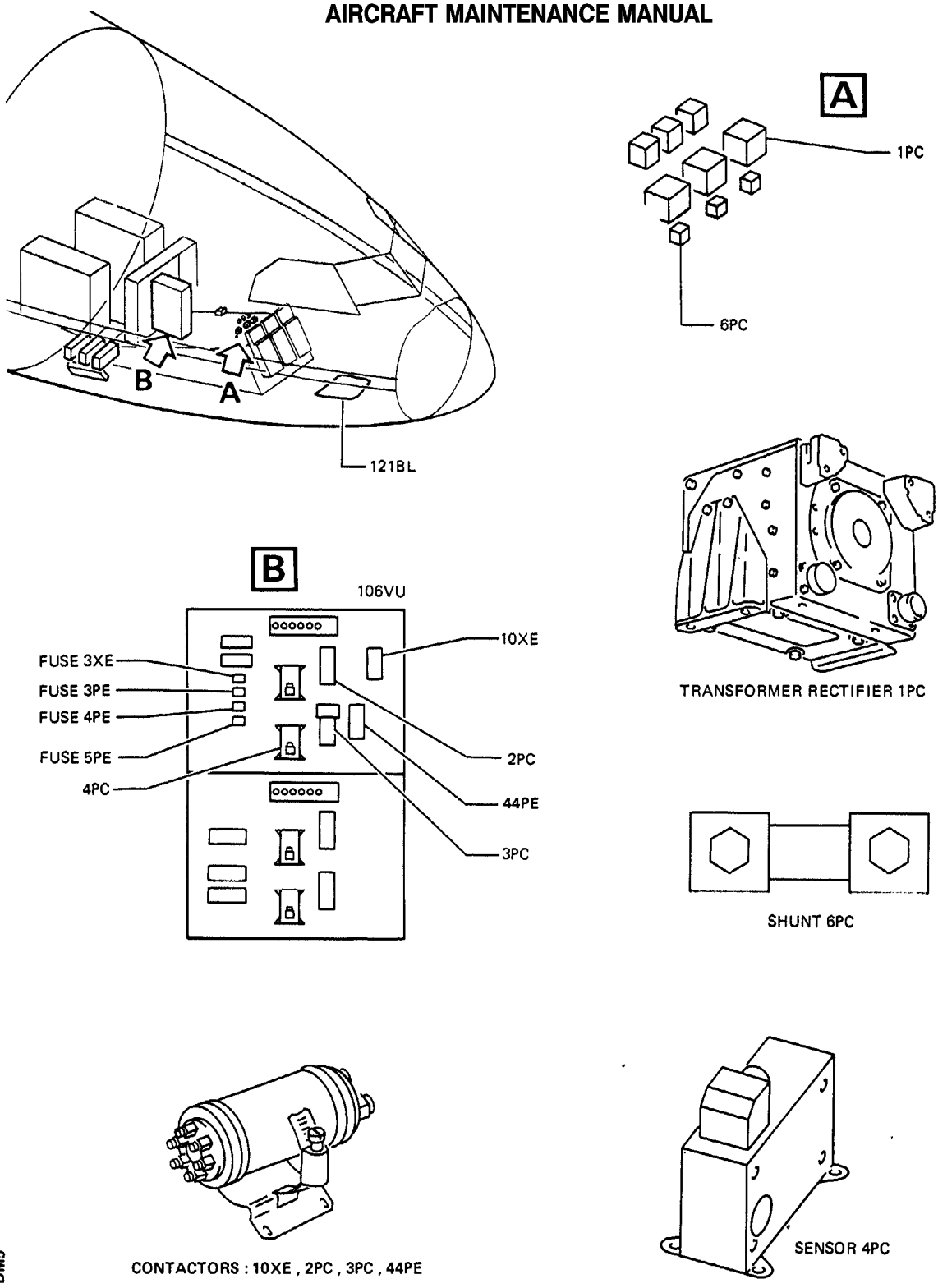
DC Essential Distribution - DC Essential Load Distribution
Figure 001



1 REF. 24-24-00 P. BLOCK 1 : FIG. EMERGENCY AC GENERATION

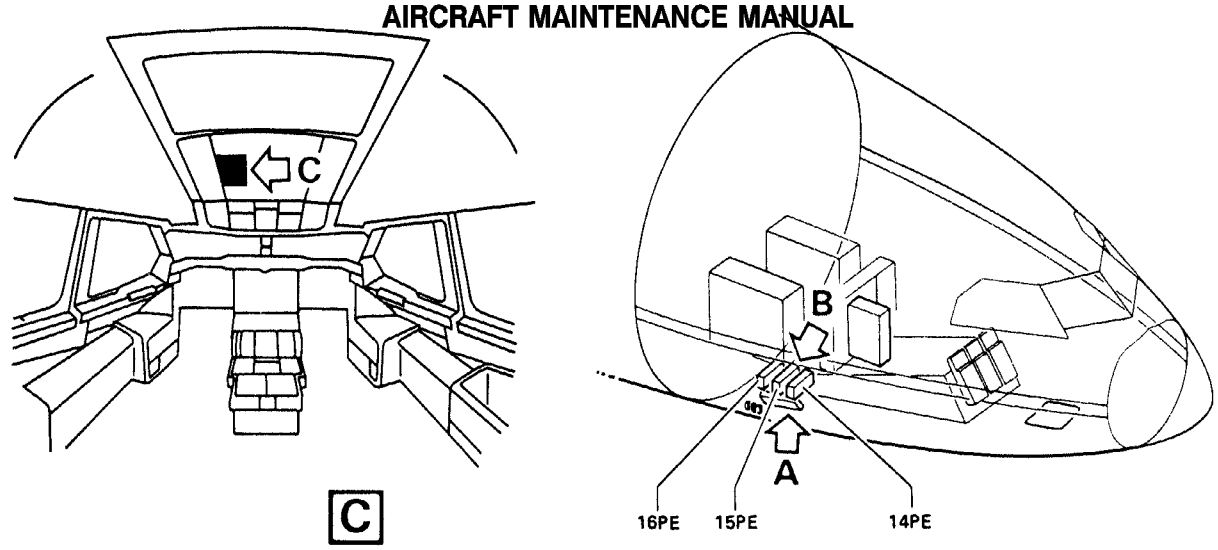
2 REF. 24-35-00 P. BLOCK 1 : FIG. DC ESSENTIAL GENERATION - CONTROL AND INDICATING SCHEMATIC

DC Essential Distribution - DC ESS ON BAT Warning
Figure 002



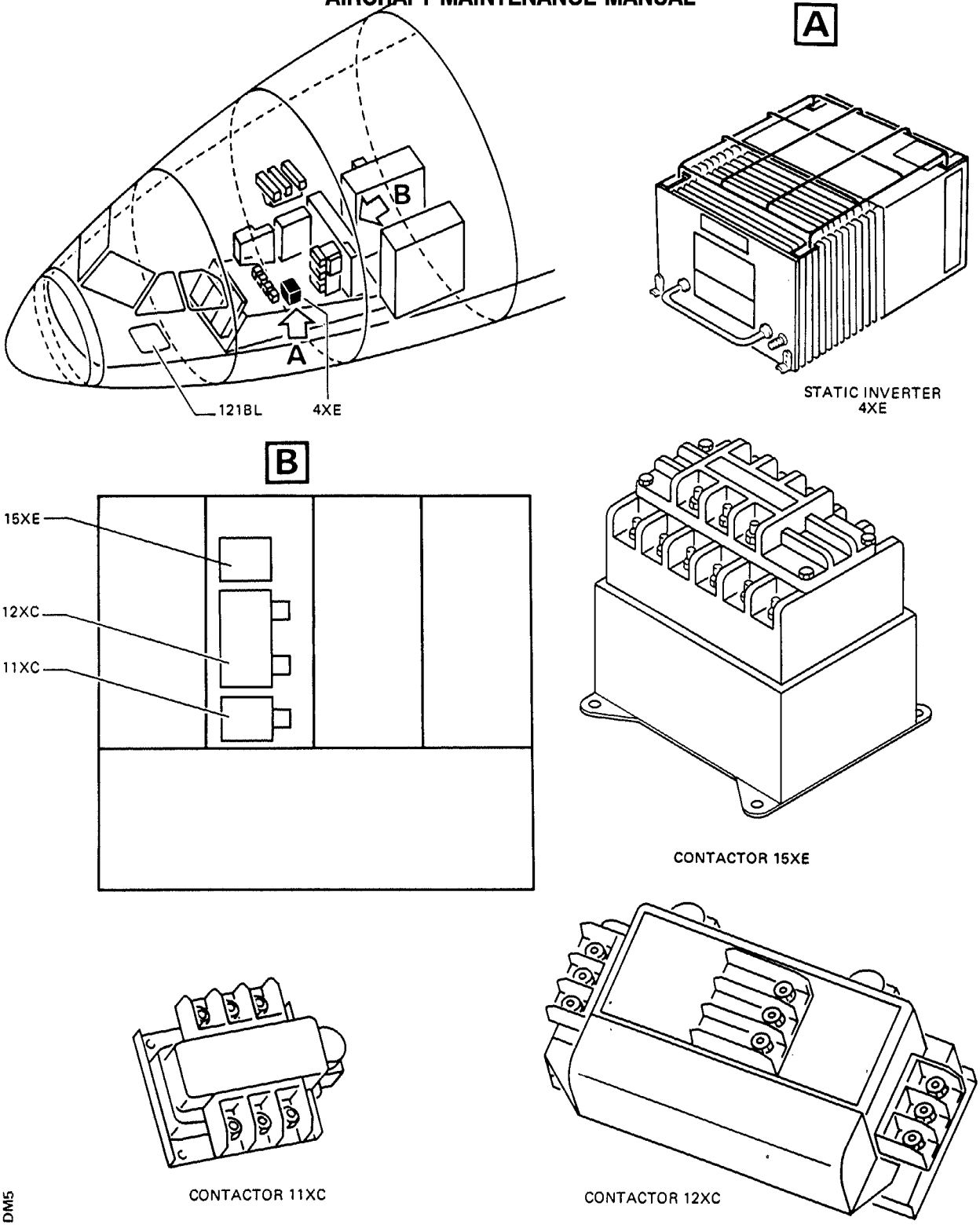
BM5 24 55 00 0 BEMO-17-12
DM5

DC Essential Distribution - Component Location
Figure 003

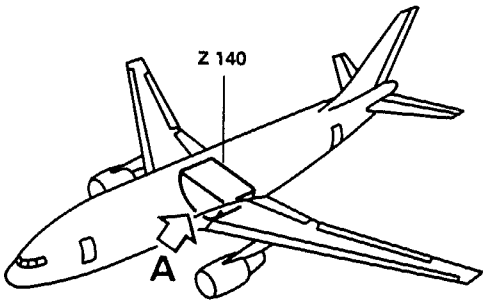


BM5 24 55 00 0 BGRO 27 21
DM5

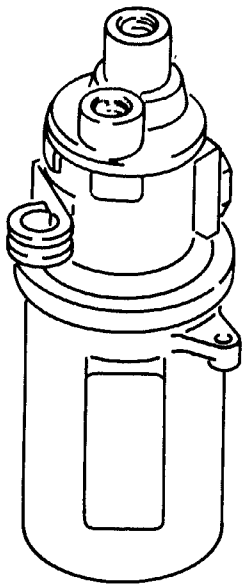
DC Essential Distribution - Component Location
Figure 004



DC Essential Distribution - Component Location
Figure 005



A



AC/DC STAND BY GENERATOR 25XE

BM5 24 55 00 0 BMMO - 17 - 12
DM5

DC Essential Distribution - Component Location
Figure 006

1. General

A. Power supply for the galleys is taken from the AC Electrical Load Distribution (Ref. 24-50-00, P. Block 1) and is distributed at forward, center and aft galley unit locations.

R **ON A/C 001-100,

B. Description

(1)When 115 V AC busbars 1XP and 2XP are energized and circuit breakers 1MC, 2MC, 3MC, 4MC, 29MC, 30MC and 16XN are closed, three phase supply is available at the contacts of the contactors 5MC, 6MC, 8MC, 10MC, 11MC, 31MC and 32MC respectively via current transformers 21XU and 22XU. The contactors are energized by 28 V DC busbar 104PP via circuit breaker 22MC and relays 3XM and 5XM to provide required 115 V AC supply to each of the galleys.

R **ON A/C 101-200,

R B. Description

R (1)When 115 V AC busbars 1XP and 2XP are energized and circuit breakers 1MC, 2MC, 3MC, 4MC, 29MC, 30MC and 16XN are closed, three phase supply is available at the contacts of contactors 5MC, 6MC, 8MC, 10MC, 11MC, 31MC and 32MC respectively via current transformers 21XU and 22XU. The contactors are energized by 28 V DC busbar 104 PP via circuit breaker 22MC and relays 3XM and 5XM to provide required 115 V AC supply to each of the galleys.

R **ON A/C ALL

(2)Electrical Power Supplies

R **ON A/C 001-100,

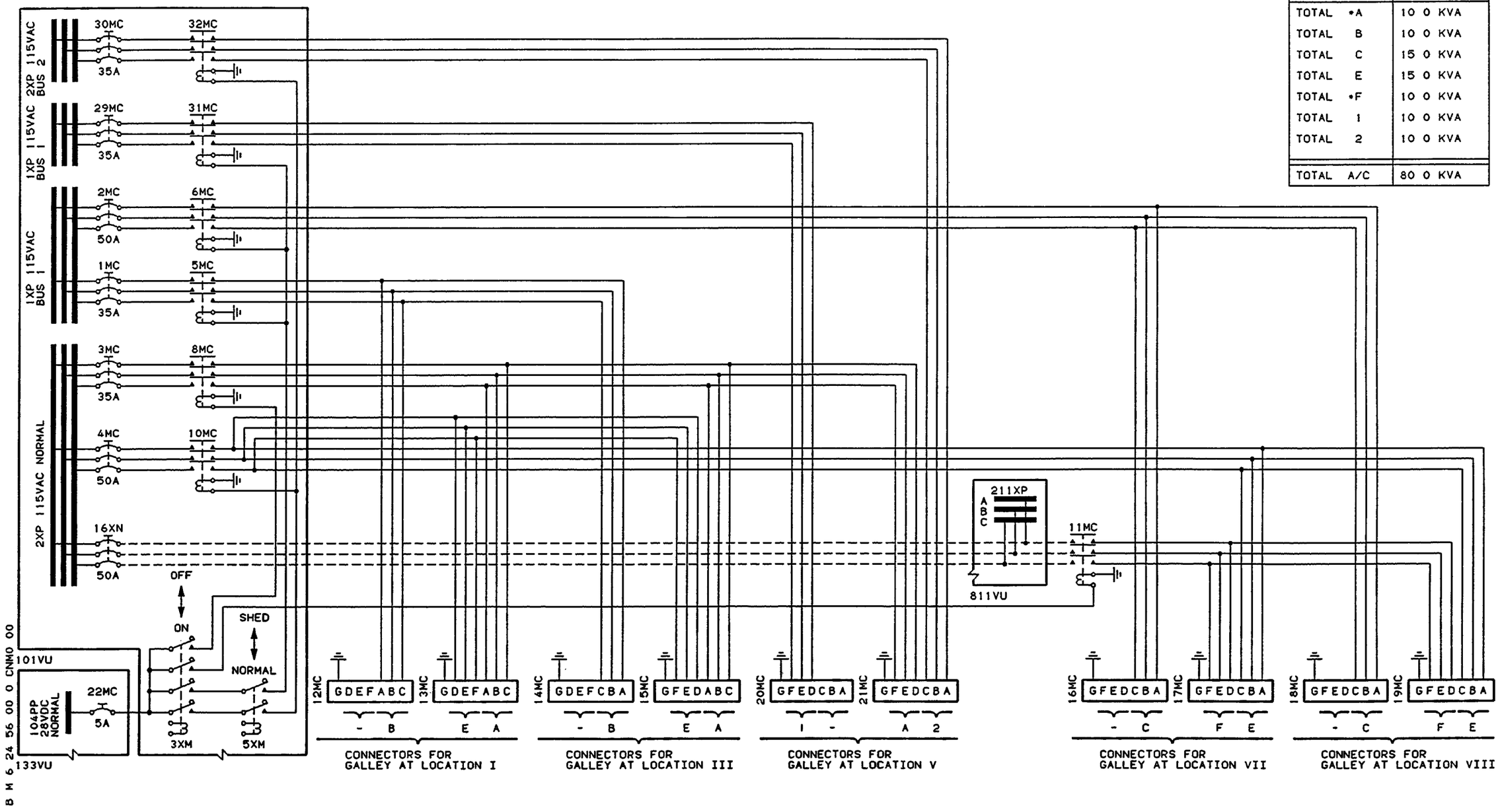
(Ref. Fig. 001)

R **ON A/C 101-200,

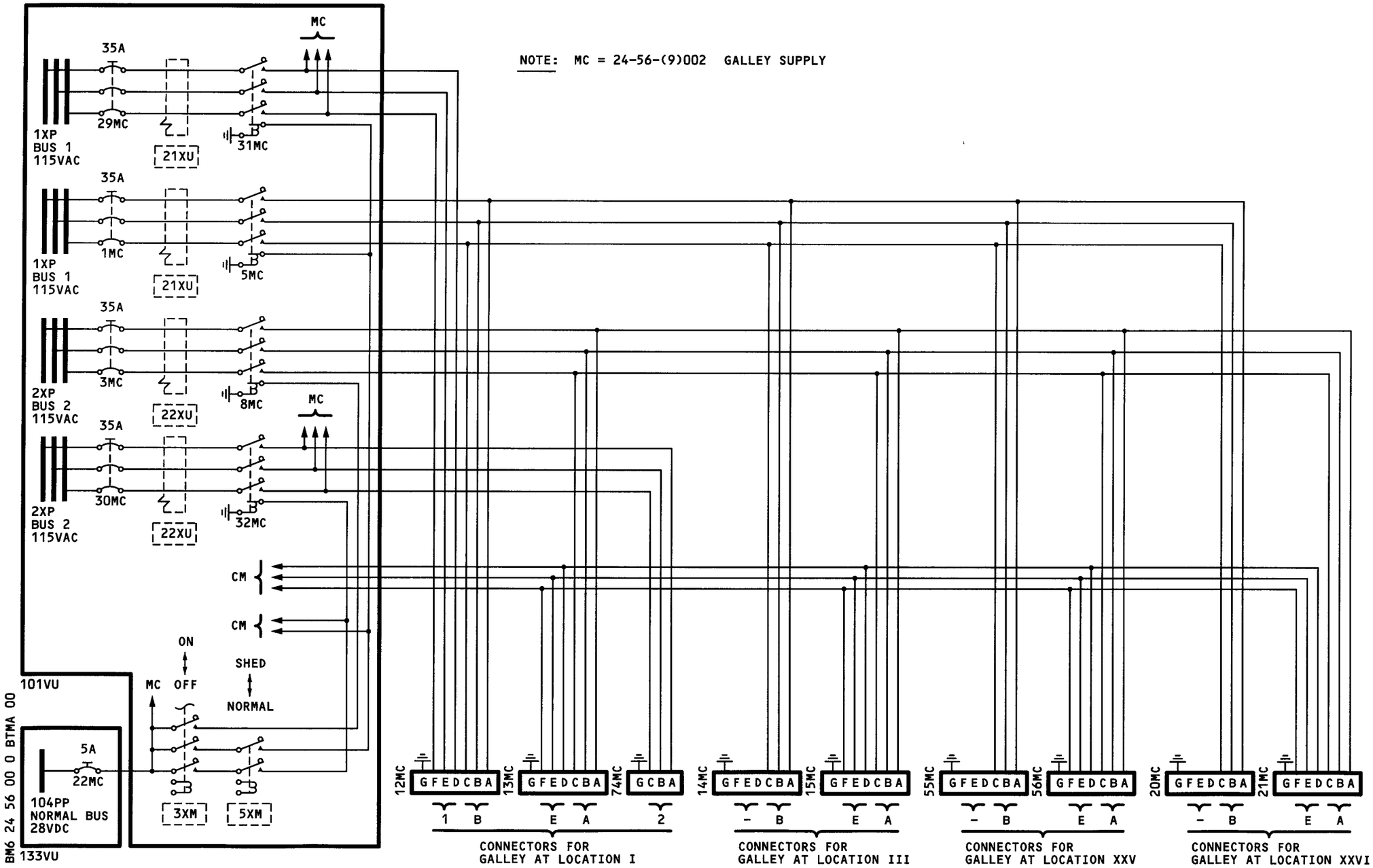
R (Ref. Fig. 002)

INTENTIONALLY BLANK

ELECTRICAL DISTRIBUTION		MAXIMUM PERMISSIBLE LOAD
TOTAL	*A	10 0 KVA
TOTAL	B	10 0 KVA
TOTAL	C	15 0 KVA
TOTAL	E	15 0 KVA
TOTAL	*F	10 0 KVA
TOTAL	1	10 0 KVA
TOTAL	2	10 0 KVA
TOTAL	A/C	80 0 KVA

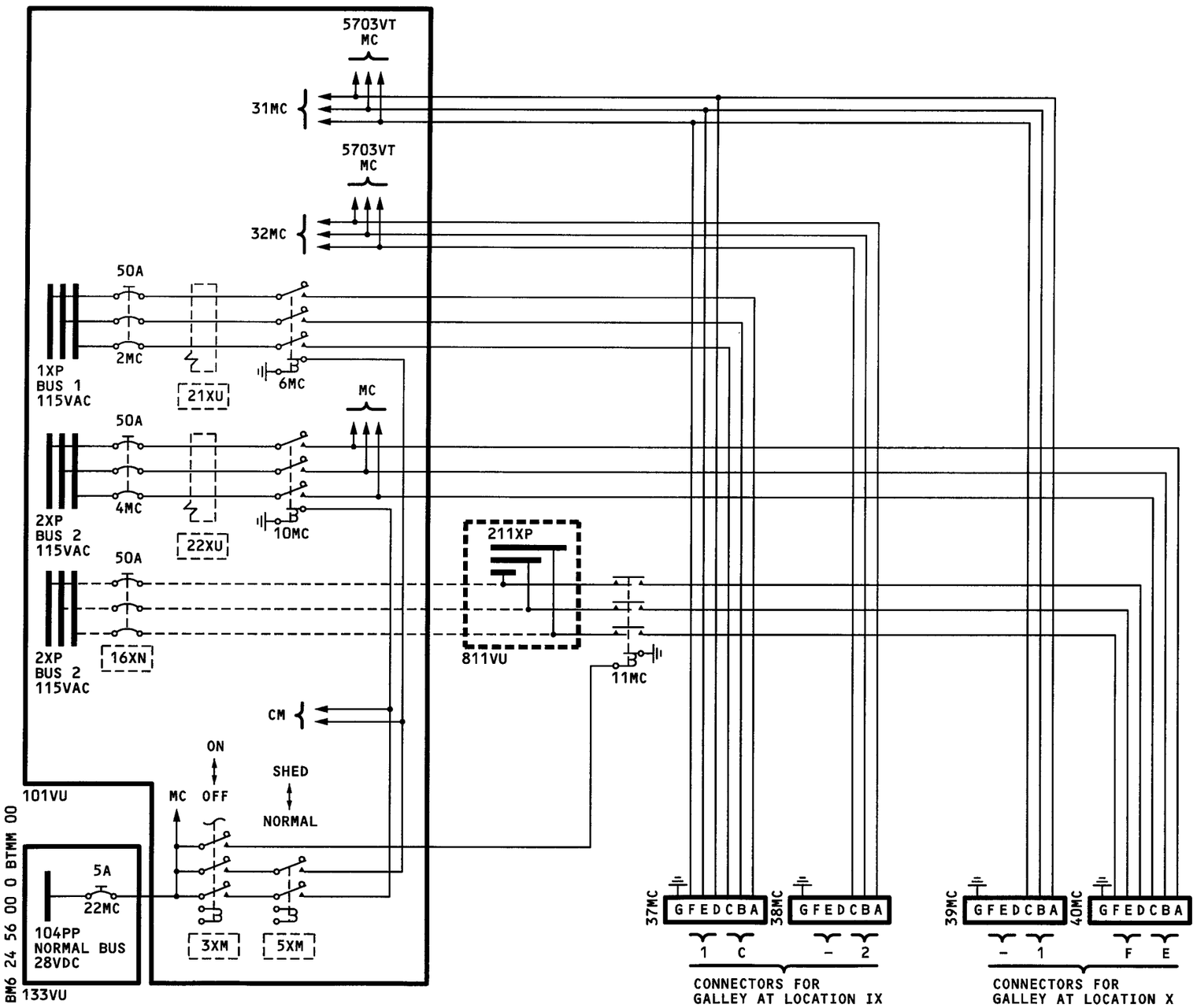


Galley Supply - Schematic
Figure 001



Galley Supply - Schematic
Figure 002

R



ELECTRICAL DISTRIBUTION	MAXIMUM PERMISSIBLE LOAD	
BUS - BAR	1XP	2XP
TOTAL *A		10,0 KVA
TOTAL B	10.0 KVA	
TOTAL C	15.0 KVA	
TOTAL E		15,0 KVA
TOTAL *F		10,0 KVA
TOTAL 1	10.0 KVA	
TOTAL 2		10,0 KVA
TOTAL BUS	35.0 KVA	45.0 KVA
TOTAL A/C	80,0 KVA	

*ALSO SUPPLIED IN CASE OF ONE GENERATOR OPERATION IN FLIGHT

Galley Supply - Schematic
Figure 002

R

1. Operational Test

A. Reason for the Job
Cursory check of the galley shedding system.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz

Referenced Procedure
- 24-41-00, P. Block 301 — AC External Power Control

C. Procedure
(1)Job set-up
(a)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that the following circuit breakers are closed:

PANEL	SERVICE	IDENT.	LOCATION
133VU	GALLEY/CONTR	22MC	V78
133VU	GALLEY/CTL	1XM	V79

(2)Test

ACTION	RESULT
1. On panel 424VU: - press GALLEY pushbutton switch.	On panel 424VU: - GALLEY pushbutton switch remains pressed in. - SHED legend of the pushbutton switch goes off. Make certain that the equipment in forward and aft galleys operates.
- press and release GALLEY pushbutton switch.	On panel 424VU: - SHED legend of GALLEY pushbutton switch comes on. In forward and aft galleys: - check that no equipment operates.

(3)Close up
(a)De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating conditions.

2. Functional Test

A. Reason for the Job
To check the automatic galley shedding.

B. Equipment and Materials

ITEM	DESIGNATION
(1)860135953100001	Test Set - Landing Gear Safety Relay Control Simulator

Referenced Procedures

- 31-51-00, P. Block 201	ECAM System - General
- 32-00-00, P. Block 501	Landing Gear - General
- 49-10-00, P. Block 501	Power Plant
- 71-00-00, P. Block 501	Power Plant

C. Procedure
(1)Job set-up
(a)Connect landing gear safety relay control simulator test set (Ref. 32-00-00, P. Block 501) and place all switches in GROUND position.
(b)Start up both engines (Ref. 71-00-00, P. Block 501) and energize the aircraft electrical network.
(c)Make certain that circuit breakers related to the ECAM system are closed and activate the R ECAM display unit (Ref. 31-51-00, P. Block 201).
(d)Select ELEC AC page.
(e)Start up the APU (Ref. 49-10-00, P. Block 501). Make certain that APU GEN pushbutton switch is released (OFF legend on).
(2)Test

ACTION	RESULT
1. On panel 424VU: - press GALLEY pushbutton switch.	On panel 424VU: - GALLEY pushbutton switch remains on (latched) with SHED legend off. Make certain that the equipment in forward and aft galleys operates. On R ECAM display unit: - check correspondence with indications on panel 424VU.
2. On panel 424VU: - press simultaneously the two OVRD SUPPLY pushbutton switches.	On panel 424VU: - ON legends of both OVRD SUPPLY pushbutton switches come on. - flowbar of OVRD SUPPLY 1 pushbutton switch comes on. - AC BUS 1 OFF, AC BUS 2 OFF and DC NORM BUS OFF warning lights come on. - GALLEY pushbutton switch is released. In forward and aft galleys:

	ACTION	RESULT
		- make certain that no equipment operates.
R	3. On panel 424VU: - press and release the two **OVRD SUPPLY** pushbutton switches.	On **R ECAM** display unit: - check correspondence with indications on panel 424VU. On panel 424VU. - all annunciator lights go off except **GALLEY** pushbutton switch.
	4. On panel 424VU: - press **GALLEY** pushbutton switch.	On panel 424VU: - **GALLEY** pushbutton switch remains pressed in (latched) and **SHED** legend goes off.
	5. On landing gear safety relay control simulator test set: - place switch **63GB** in **FLIGHT** position.	On panel 424VU: - no change.
	6. On panel 424VU: - press **APU GEN** pushbutton switch. - press and release **GEN 2** pushbutton.	On panel 424VU: - **OFF** legend of **APU** goes off. - **OFF** legend of **GEN 2** pushbutton switch comes on. - **GALLEY** pushbutton switch remains pressed in with **SHED** legend off. Check that all forward and aft galleys operate. On the **R ECAM** display: - check correspondence with indications on panel 424VU.
	7. On panel 424VU: - press and release **GEN 1** pushbutton switch.	On panel 424VU: - **OFF** legend of **GEN 1** pushbutton switch comes on. - **OFF** legend of **GEN 2** pushbutton switch remains on. - **GALLEY** pushbutton switch remains pressed in (with **SHED** legend off). In forward and aft galleys: - make certain that the secondary galleys only are operative. On **R ECAM** display unit: - check correspondence with indications on panel 424VU.
	8. On landing gear safety relay control simulator test set: - place switch **63GB** in **GROUND** position.	On panel 424VU: - no change. On **R ECAM** display unit: - no change. Check that all forward and aft galleys operate.
	9. On panel 424VU: - press and release **GALLEY** pushbutton switch.	On panel 424VU: - **SHED** legend of **GALLEY** pushbutton switch comes on.

ACTION	RESULT
	In forward and aft galleys: - check that no equipment operates.

(3)Close up
(a)Shut down both engines (Ref. 71-00-00, P. Block 501).
(b)Shut down the APU (Ref. 49-10-00, P. Block 501).
(c)Disconnect test set (Ref. 32-00-00, P. Block 501).
(d)Restore system and aircraft to normal operating conditions.

Ref. MMEL Sect. 1-24, Item 12-b

1. Deactivation

A. Reason for the Job
To allow Aircraft to fly with the automatic and manual systems inoperative, provided all galley loads are disconnected.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety and Tags
(2)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz

Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Deactivation
(a)Open, safety and tag the following circuit breakers :

R **ON A/C 101-200,

PANEL	SERVICE	IDENT.	LOCATION
133VU	ELEC PWR/GALLEY/CNTOR	22MC	331/V78
101VU	GEN1/GALLEY	1MC	GEN1/A 5
101VU	GEN1/GALLEY	2MC	GEN1/A 8
101VU	GEN2/SEC GALLEY	3MC	GEN2/A 8
101VU	GEN2/GALLEY	4MC	GEN2/A11
101VU	GEN1/GALLEY	29MC	GEN1/A 2
101VU	GEN2/GALLEY	30MC	GEN2/C17
101VU	GEN2/210XP BUS BAR AND GALLEY	16XN	GEN2/C 5

R **ON A/C ALL

(3)Test after deactivation

ACTION	RESULT
On panel 424VU: - Press GALLEY pushbutton switch.	In galleys: Make certain that no equipment is operating.

ACTION	RESULT
- Press and release GALLEY pushbutton switch.	No change.

(4)Close-up
De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz

Referenced Procedure	
- 24-41-00, P. Block 301	AC External Power Control

B. Procedure
(1)Job set-up
Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Reactivation

R **ON A/C 101-200,

(a)Remove safety clips and tags and close circuit breakers 22MC, 1MC, 2MC, 3MC, 4MC, 29MC, 30MC, 16XN.
(b)Refer to TSM 24-26-00.

R **ON A/C ALL

(3)Close-up
De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, P. Block 301).

REFUELING ON BATTERY

1. General
   (Ref. Fig. 001)

R **ON A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

   (Ref. Fig. 002)

   **ON A/C ALL

   (Ref. Fig. 003)

   **ON A/C ALL

   The network is composed of two sub-busbars :
   - 901PP which supplies controls, indicating circuits and valves relative to this function.
   - 901XP which supplies fuel quantity indicating circuits and enables refuel/defuel operations to be carried out on the ground.

   It is supplied normally by the aircraft network.
   In the case of an electrical ground power unit not being available battery 1 may be used as a power source.

2. Component Location
   (Ref. Fig. 004)
   (Ref. Fig. 005)

R **ON A/C 101-200,

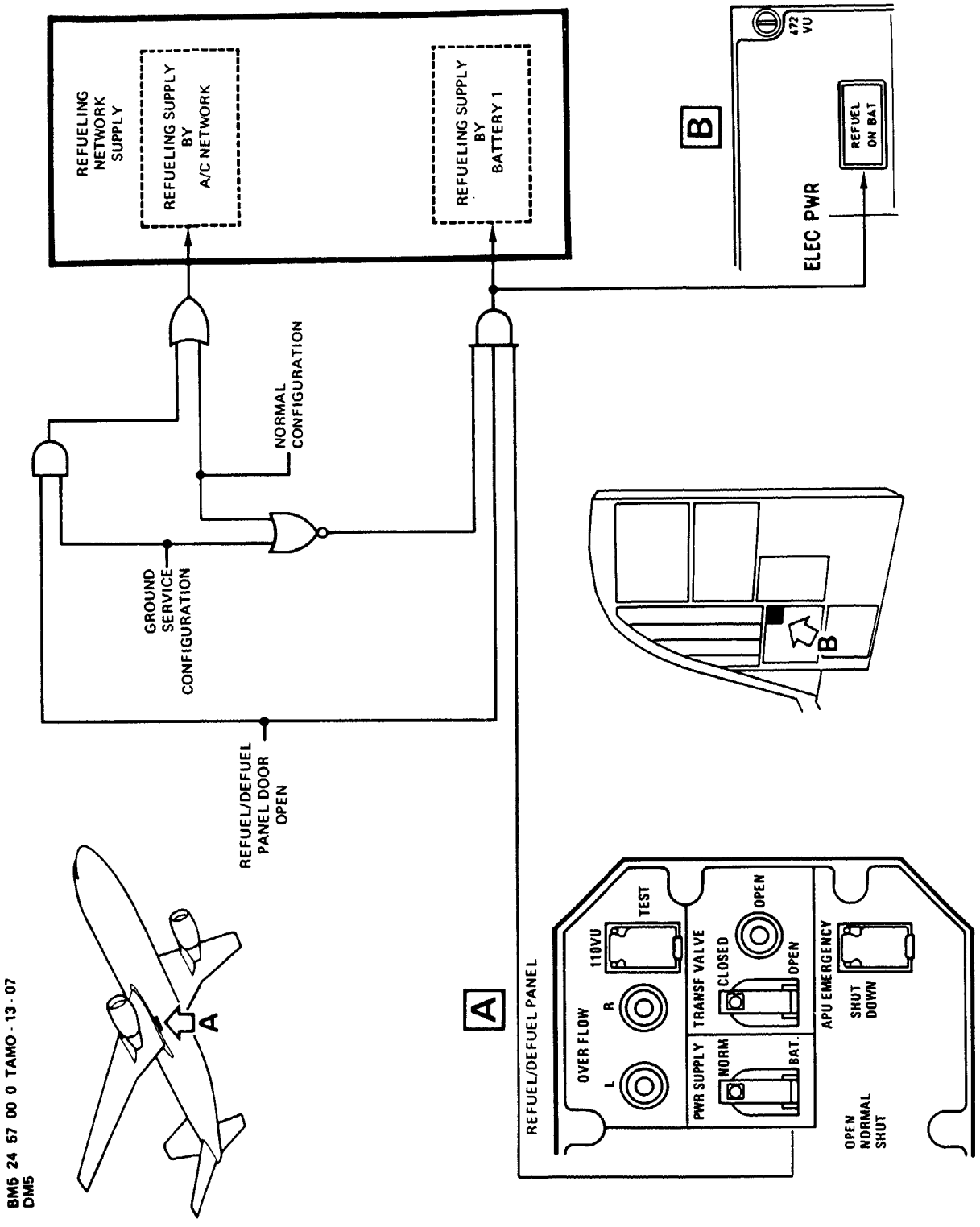
R Post SB 28-2108 For A/C 101-200,

R (Ref. Fig. 006)

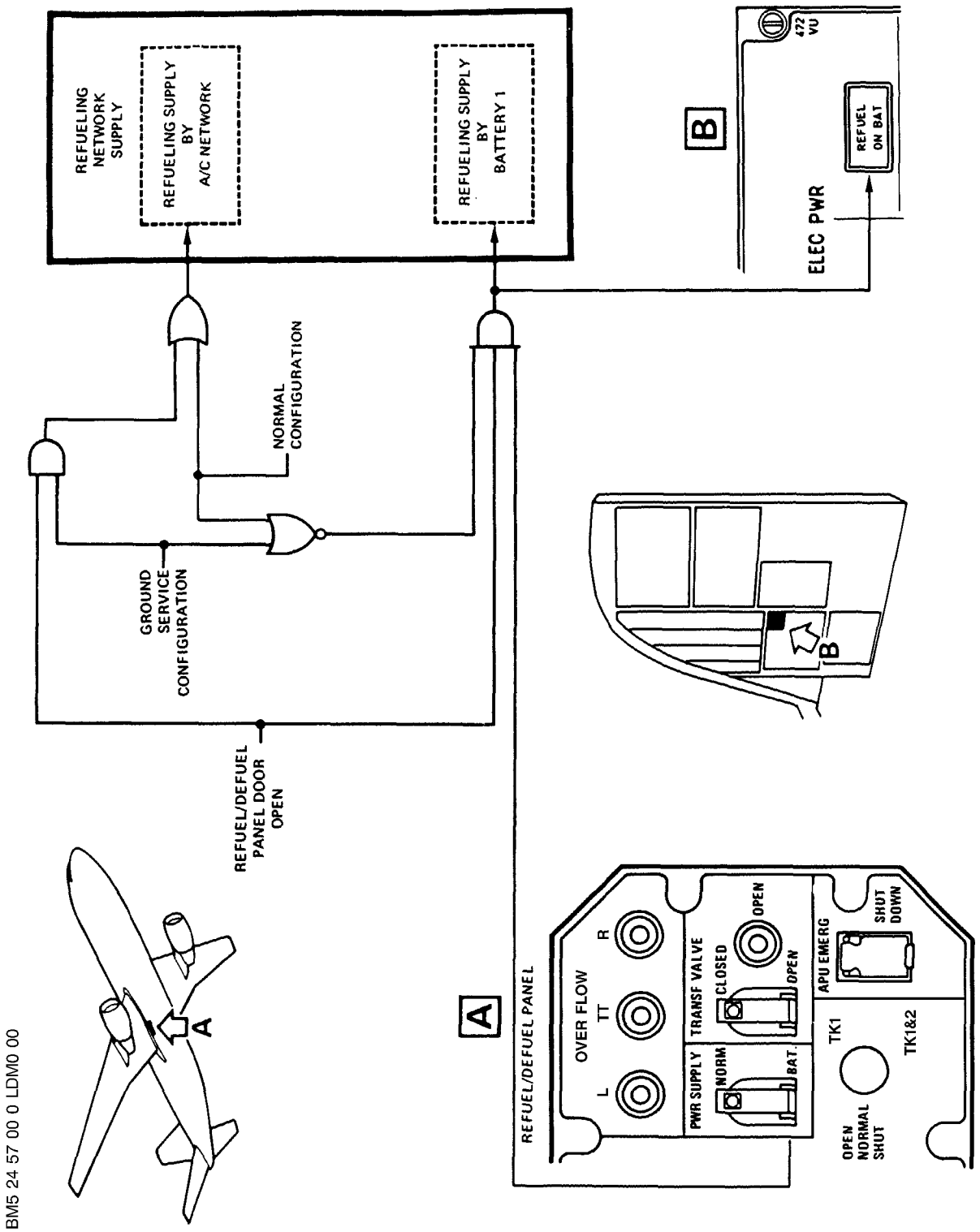
R **ON A/C ALL

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
10PE	CNTOR - BAT 1	281VU	122	121BL	24-31-00
14PE	BATTERY 1		122	121BL	24-31-11
14PR	INDICATOR LIGHT - ELEC PWR/REFUEL ON BAT	472VU	212		24-57-00
15PR	SWITCH - PWR SUPPLY/NORM/BAT	110VU	144	144DR	24-57-00

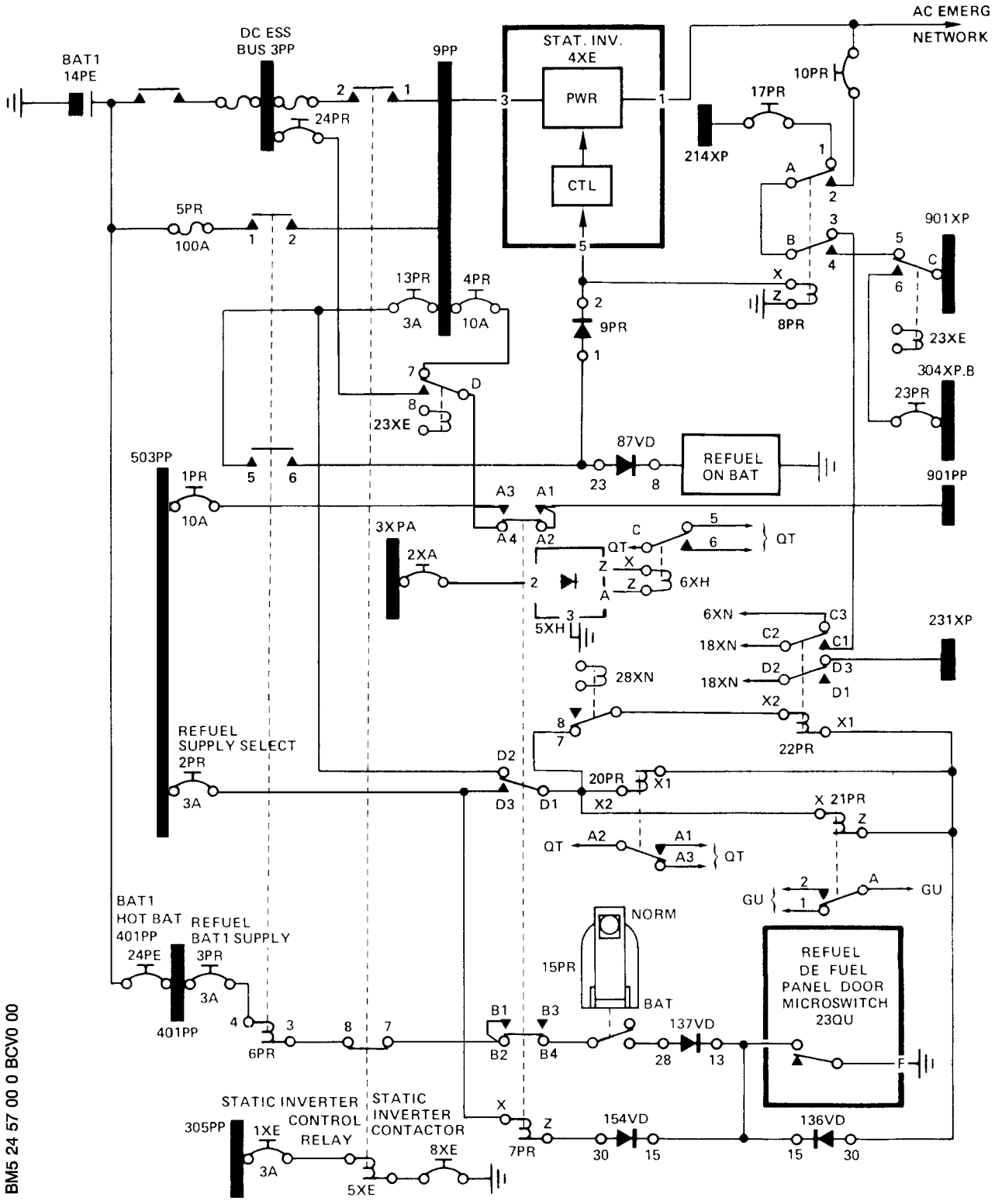
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
23QU	MICROSWITCH - REFUEL/DEFUEL PANEL DOOR		144	144DR	24-57-00
4XE	STATIC INVERTER		120	121BL	24-24-11
5XE	CNTOR - STATIC INVERTER	106VU	122	121BL	24-24-00



Refueling Supply
Figure 001

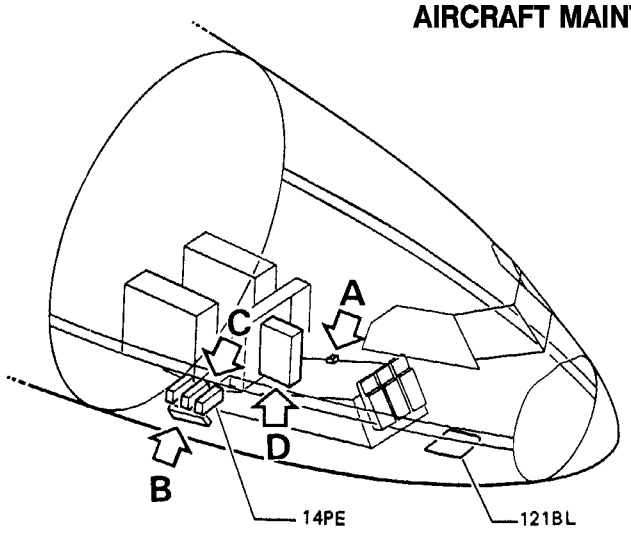


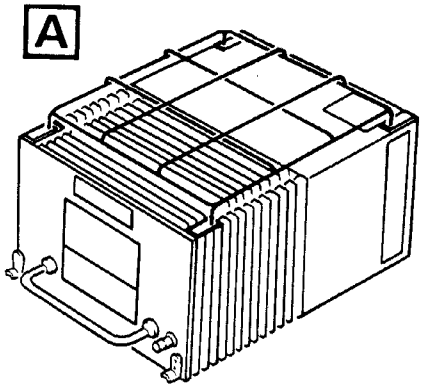
Refueling Supply
Figure 002



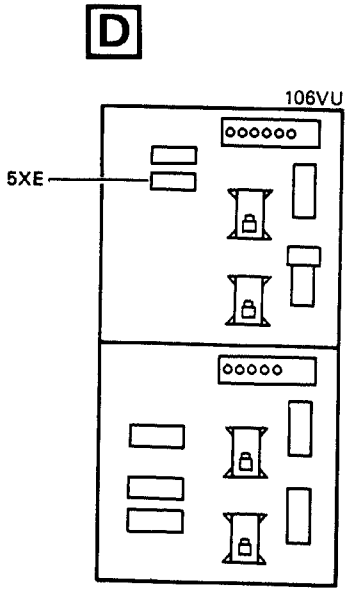
BM5 24 57 00 0 BCV0 00

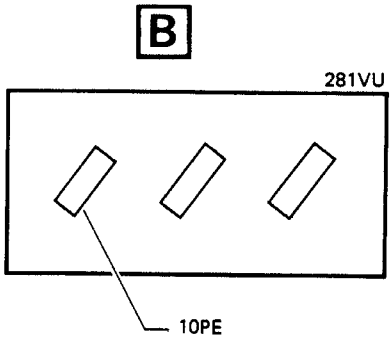
Refueling Supply - Schematic
Figure 003

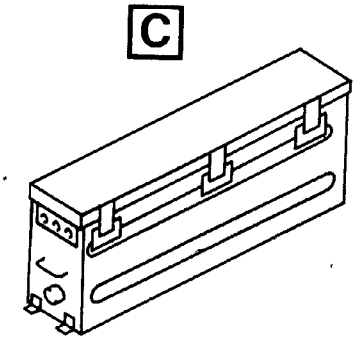




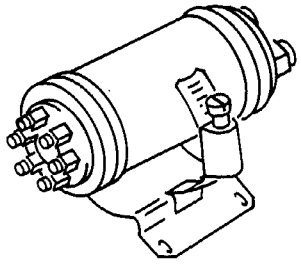
STATIC INVERTER
4XE







BATTERY 14PE



CONTACTORS 5XE - 10PE

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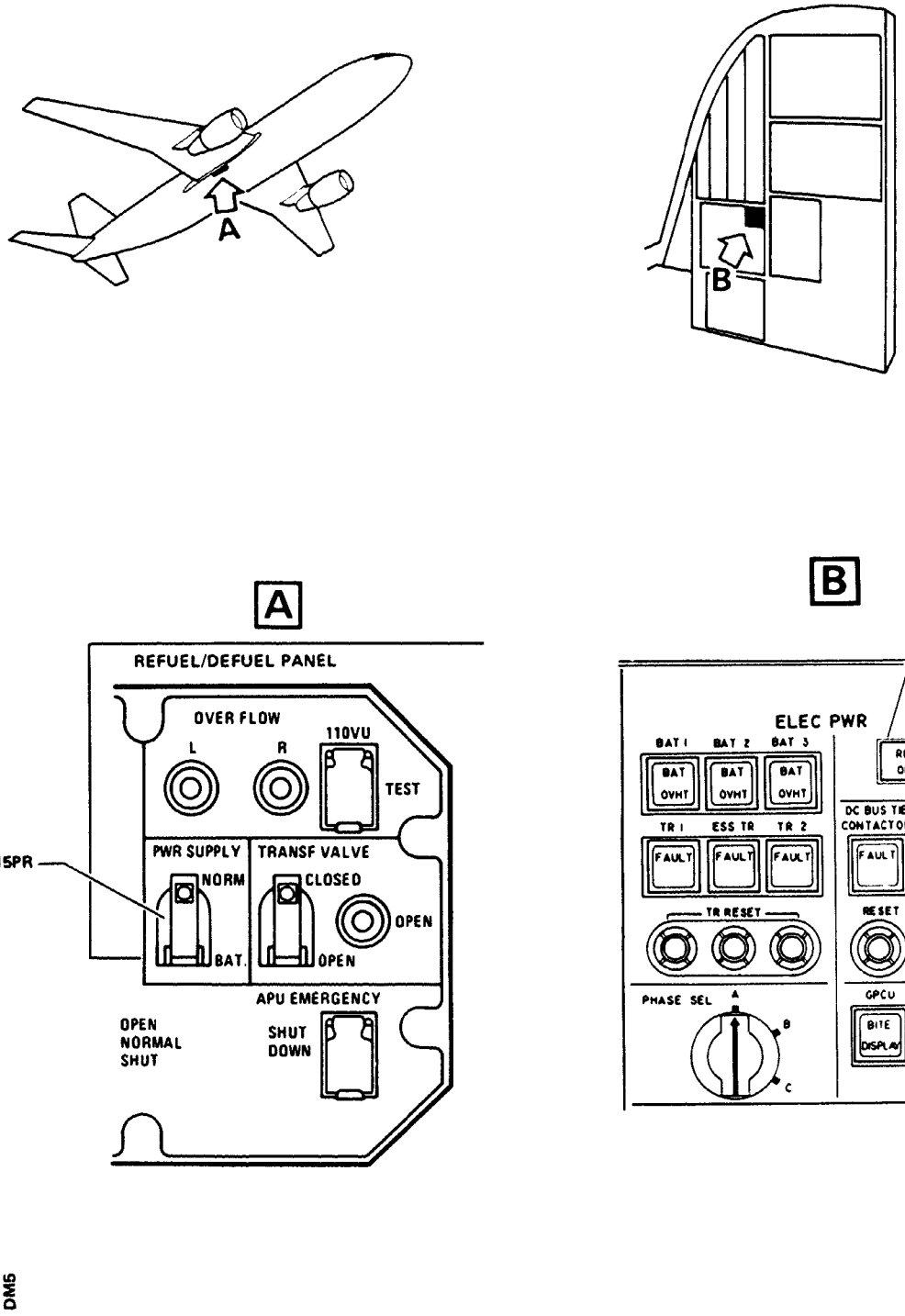
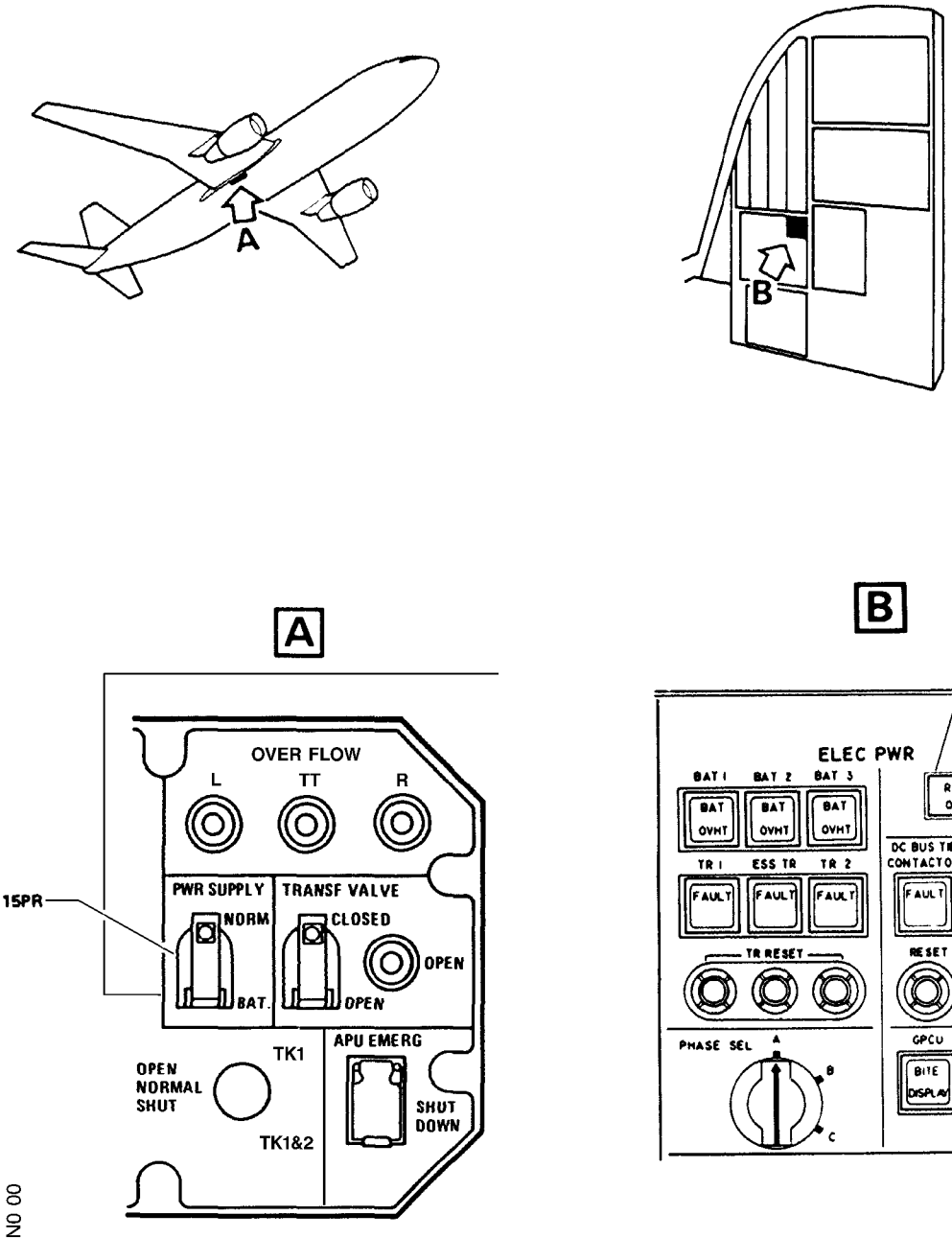
Refueling on Battery - Avionics Compartment - Location
Figure 004



Refueling on Battery - Control and Indicating - Location
Figure 005



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Refueling on Battery - Control and Indicating - Location
Figure 006

R

3. Control and Indicating Circuits
(Ref. Fig. 001,)

R **ON A/C 001-100,

(Ref. Fig. 001, 003)

R **ON A/C 101-200,

R Post SB 28-2108 For A/C 101-200,

R (Ref. Fig. 002,)

**ON A/C ALL

The network is supplied :
- from the aircraft network if it is in normal configuration
- from the aircraft network if it is in ground service configuration and besides, if the refuel/defuel panel door is open
- directly from battery 1 if the three following conditions are met :
  . aircraft not supplied
  . refuel/defuel panel door open
  . PWR SUPPLY switch of the refuel/defuel system is on BAT position.

NOTE : PWR SUPPLY switch is located on refuel/defuel panel and has two stable positions, NORM and BAT.

NOTE : Refuel/Defuel network can only be supplied from battery 1 if PWR SUPPLY switch is specifically set to BAT position.
Refuel/Defuel system supply from the aircraft network is possible irrespective of the switch position.

When battery 1 is used as power supply source, white REFUEL ON BAT indicator light located on maintenance panel indicates that certain electrical circuits are energized (although the whole flight compartment indications are off).

1. Operational Test

A. Reason for the Job
Check power supply of refueling on battery circuit.

R B. Procedure
R NOTE : Aircraft must not be energized.
R (1)Job set-up
R (a)On panel 424VU
R - make certain that BAT 1, 2 and 3 pushbutton switches are released (out).
R - make certain that BAT OVRD pushbutton switch is released (out).
R (b)In zone 144
R - open door 144DR giving access to refuel/defuel panel 110VU.

**ON A/C 101-200,

Post SB 28-2108 For A/C 101-200,

R
(2)Test

ACTION	RESULT
On panel 110VU : 1. Raise switch guard and place PWR SUPPLY switch in BAT position.	On panel 110VU : - fuel quantity indications are displayed. On panel 472VU - REFUEL ON BAT indicator light comes on. In avionics compartment - static inverter operates.
2. Raise switch guard and press OVERFLOW HI LVL TEST pushbutton switch.	On panel 110VU - HIGH LEVEL indicator lights comes on.
3. Release OVERFLOW HI LVL TEST pushbutton switch and lower switch guard.	- all HIGH LEVEL indicator lights go off.
4. Place PWR SUPPLY switch in NORM position and lower switch guard.	On panel 110VU - fuel quantity indications are no longer displayed. On panel 472VU - REFUEL ON BAT indicator light goes off. In avionics compartment - static inverter stops operating.

R

**ON A/C ALL

R

(2)Test

ACTION	RESULT
On panel 110VU : 1. Raise switch guard and place **PWR SUPPLY** switch in **BAT** position.	On panel 110VU : - fuel quantity indications are displayed. On panel 472VU - **REFUEL ON BAT** indicator light comes on. In avionics compartment - static inverter operates.
2. Raise switch guard and press **OVERFLOW HI LVL TEST** pushbutton switch.	On panel 110VU - **HIGH LEVEL** indicator lights comes on.
3. Release **OVERFLOW HI LVL TEST** pushbutton switch and lower switch guard.	- all **HIGH LEVEL** indicator lights go off.
4. Place **PWR SUPPLY** switch in **NORM** position and lower switch guard.	On panel 110VU - fuel quantity indications are no longer displayed. On panel 472VU - **REFUEL ON BAT** indicator light goes off. In avionics compartment - static inverter stops operating.

R

R (3)Close-up

R In zone 144

R - close door **144DR** giving access to refuel/defuel panel 110VU.

R **ON A/C ALL

R Post SB 24-2060 For A/C ALL

R ELECTRICAL ROUTING - INSPECTION/CHECK

R 1. Not applicable

R **ON A/C ALL

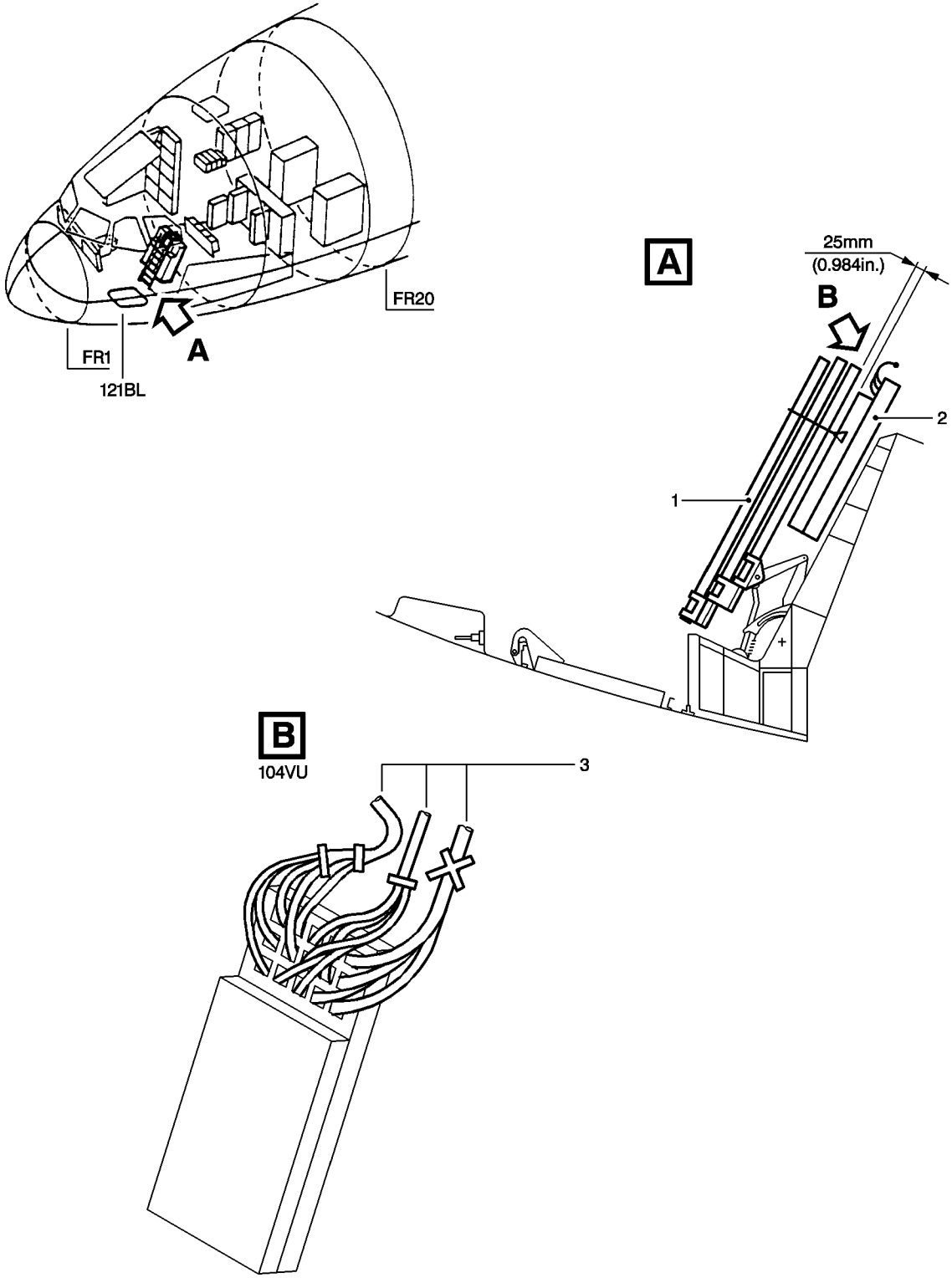
R 1. Detailed Inspection of 104VU Electrical Loom Installation

R A. Reason for the Job
R The purpose of this procedure is to do a detailed inspection of 104VU
R electrical loom installation.

R B. Equipment and Materials

ITEM	DESIGNATION
R (1)	Access Platform
Referenced Procedures	
- 24-00-00, P. Block 301	Electrical Power - General
- 24-41-00, P. Block 301	AC External Power Control

R C. Procedure
(Ref. Fig. 601)
R (1)Job set-up
R (a)Make sure that the aircraft electrical circuits are de-energized
R (Ref. 24-41-00, P. Block 301).
R (b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
R (c)Install the access platform at the access door 121BL.
R (d)Open the access door 121BL.
R (2)Inspection
R (a)Unfold the ladder (1) and remove the protective cover on relay box
104VU (2).
R (b)Do a detailed visual inspection of the electrical bundle at the top of
R the relay box 104VU. If necessary, mark to identify the damaged wires
to do a repair.
R (c)Fold back the ladder (1).
R (d)Check that there is a minimum clearance of 25 mm (1 in.) between the
looms (3) and the ladder (1).
R (e)If necessary, position the looms (3) in a different shape than
R initially to keep the wires as close as possible to the relay box
104VU.



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Inspection of the Electrical Bundle at the Top of
Relay Box 104VU
Figure 601

R

NOTE : You must always keep the segregation between the wires.

R (f)Check the condition of the protective cover, then install it on 104VU.

R (3)Close-up

R (a)Make certain that the work area is clean and clear of tools and miscellaneous items of equipment.

R (b)Close the access door 121BL.

R (c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

R (d)Remove access platform.

R 2. General Visual Inspection of EWIS Installed in Avionics Compartment (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of EWIS installed in the avionics compartment.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System) R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-27, P. Block 401	Avionics Compartment Floor Panels
- 53-10-53, P. Block 401	Avionics Compartment - Fixed Partition
R - ESPM 205211	

C. Procedure

(Ref. Fig. 602)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at FWD cargo compartment door 811.

(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove partition walls at FR20 (Ref. 53-10-53, P. Block 401).

(g)Remove floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(2)General visual inspection of wiring installed in avionics compartment

(a)Do a visual inspection of wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation (Ref. ESPM 205211).

1 On AC/DC feeder routes: 1G, 2G, 3G, 4G, 1E, 2E and 3E.

2 On AC/DC power distribution routes: 1P, 2P, 3P, 4P and 5P.

3 On flight control wiring route.

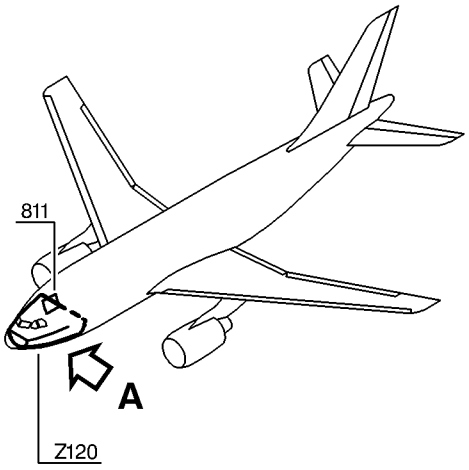
4 On engine control wiring routes: 1S, 2S and 3S.

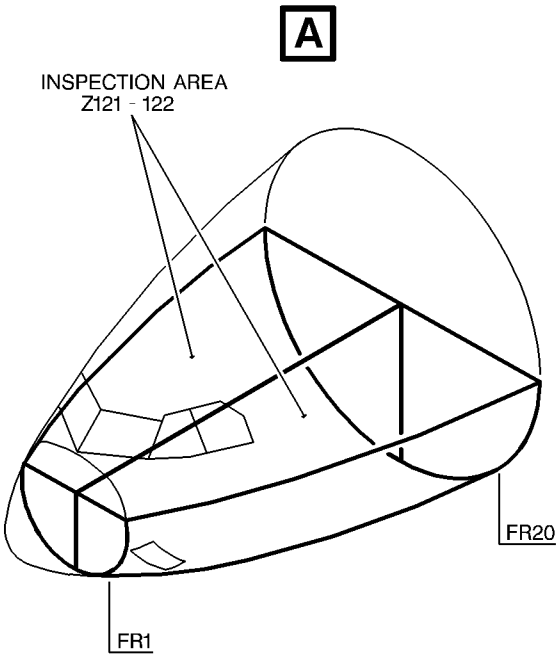
5 On miscellaneous routes: 1M, 2M and 3M.

6 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.

7 On radio communication and navigation control wiring routes: 1C and 2C.

8 On radio communication and radio navigation, interphone and ADF wiring routes 1R, 2R, 3R, 4R and 5R.





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R Avionics Compartment - Inspection Area - Zones 121-122
Figure 602

9 On VHF1, VHF2, ATC1 and ATC2, DME1 and DME2, HF1, HF2, VHF3 wiring routes: 1T, 2T, 3T, 4T, 7T, 8T and 9T.

10 On VOR1, VOR2, glide, localiser, marker wiring routes: 1U, 2U, 3U, 4U and 5U.

11 On VHF (flux valve) wiring routes: 1V, 2V and 7V.

NOTE : Use a flash light or a mirror if necessary.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(c)Install partition walls at FR20 (Ref. 53-10-53, P. Block 401).

(d)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(e)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(f)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(g)Remove access platform.

R 3. General Visual Inspection of G Routes and 105VU, 106VU and APU Bus (EWIS)

A. Reason for the Job

The purpose of this procedure is to do an inspection of G routes and 105VU, 106VU and APU Bus.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-27, P. Block 401	Avionics Compartment Floor Panels
- 53-10-53, P. Block 401	Avionics Compartment - Fixed Partition
R - ESPM 205211	

C. Procedure

(Ref. Fig. 603)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at FWD cargo compartment door 811.

(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove partition walls at FR20 (Ref. 53-10-53, P. Block 401).

(g)Remove floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(2)General visual inspection of G routes and relay box 105VU, DC power center 106VU and APU Bus

(a)Do a visual inspection of wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation (Ref. ESPM 205211).

1 On AC/DC feeder routes: 1G, 2G, 3G, 4G.

2 In relay box 105VU and DC power center 106VU.

3 On APU bus.

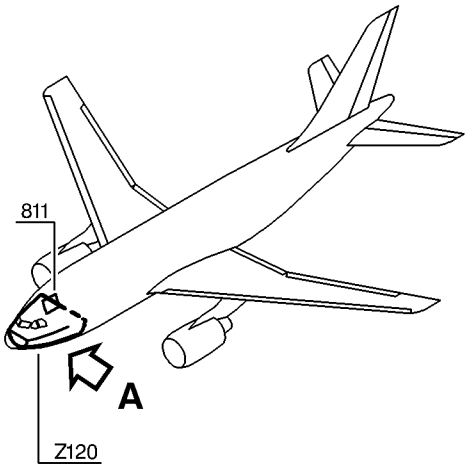
NOTE : Use a flash light or a mirror if necessary.

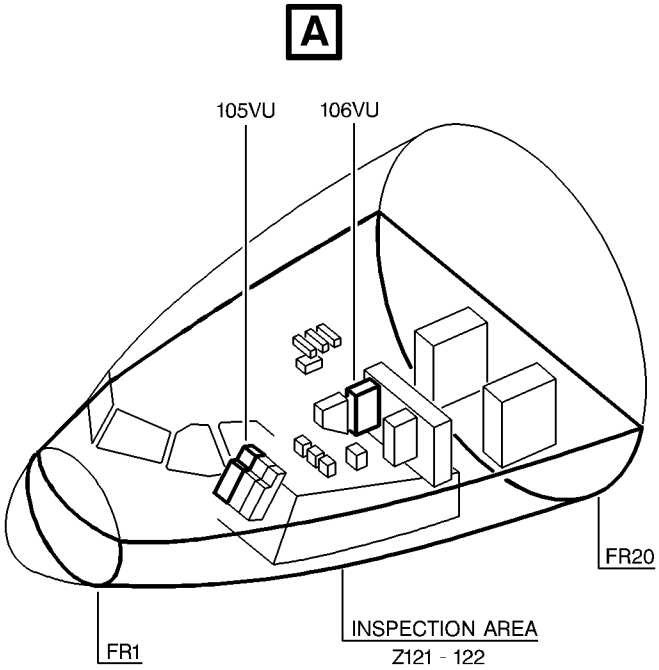
(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(c)Install partition walls at FR20 (Ref. 53-10-53, P. Block 401).





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R Avionics Compartment - Inspection Area - Zones 121-122
Figure 603

(d)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(e)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(f)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(g)Remove access platform.

R 4. General Visual Inspection of Circuit Breakers and EWIS Inside 101VU (EWIS)

A. Reason for the Job

The purpose of this procedure is to do an inspection of circuit breakers
R and EWIS inside 101VU.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
R - ESPM 205211	

C. Procedure

(Ref. Fig. 604)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at door 121BL.

(d)Open access door 121BL.

(e)Open panels of AC power center 101VU.

(2)General visual inspection of circuit breakers and wiring inside AC power center 101VU.

(a)Do a visual inspection of wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation
R (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

(3)Close-up

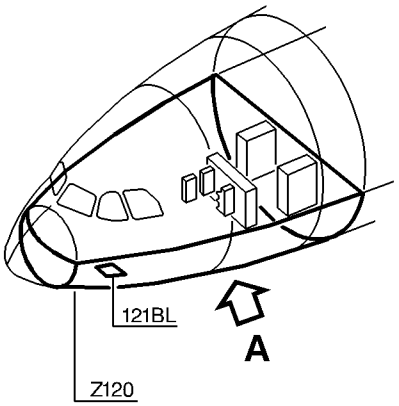
(a)Make certain that the work area is clean and clear of tools and other items.

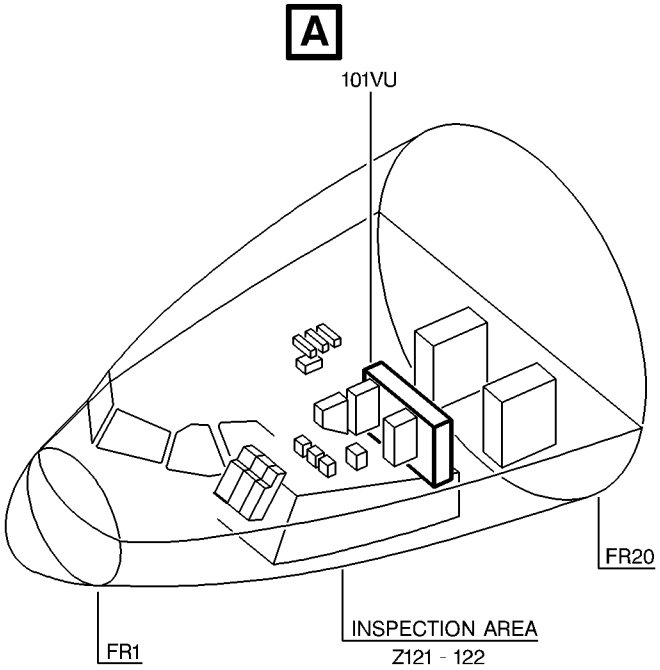
(b)Close panels of AC power center 101VU.

(c)Close access door 121BL.

(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(e)Remove access platform.





BM5 24 92 00 6 ANM0 00

R

101VU Location
Figure 604

R 5. General Visual Inspection of All EWIS Installed in C/B Box 921VU (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of all EWIS installed in C/B Box 921VU.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System) R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-54-10, P. Block 201	FWD Cargo Compartment Linings
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 605)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at FWD cargo compartment door 811.

(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove sidewall and ceiling panels between FR22 and FR23 (Ref. 25-54-10, P. Block 201).

(2)General visual inspection of all wiring installed in C/B Box 921VU

(a)Do a visual inspection of the wiring to make sure that there is no R overheating and discoloration (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

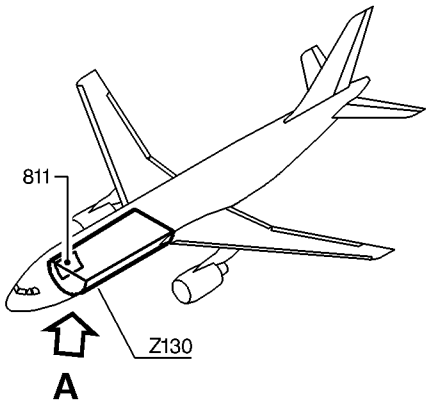
(b)Install sidewall and ceiling panels between FR22 and FR23 (Ref. 25-54-10, P. Block 201).

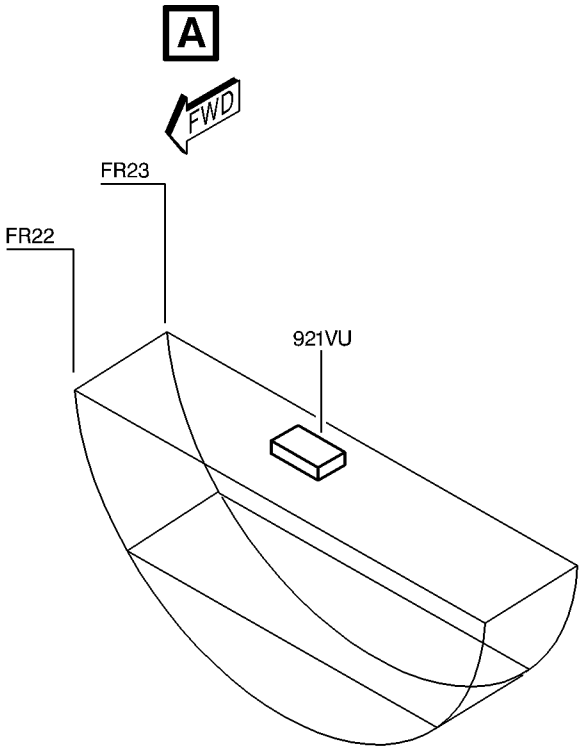
(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.





BM5 24 92 00 6 APM0 00

921VU Location
Figure 605

R

R 6. Detailed Inspection of EWIS in Area of Pressure Seals LH/RH Installed
R in Bay Aft of FWD Cargo Compartment (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of EWIS in Area of pressure seals LH/RH.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System) procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-55, P. Block 401	FWD Cargo Compartment Fixed Partition
R - ESPM 205212	

C. Procedure

(Ref. Fig. 606)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at FWD cargo compartment door 811.

(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove FWD cargo-compartment partition at FR38.2 (Ref. 53-10-55, P. Block 401).

(2)Detailed inspection of wiring in area of pressure seals LH/RH

(a)Do a detailed inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205212).

1 On AC/DC feeder routes: power feeders 1 and 2 G, E, P routes.

2 In AC/DC power distribution routes: trim air valves, pressure regulation valves, pressure relief valves.

3 On flight control wiring routes: wing equipment.

(3)Make sure that there is no dust, lint or hydraulic contamination.

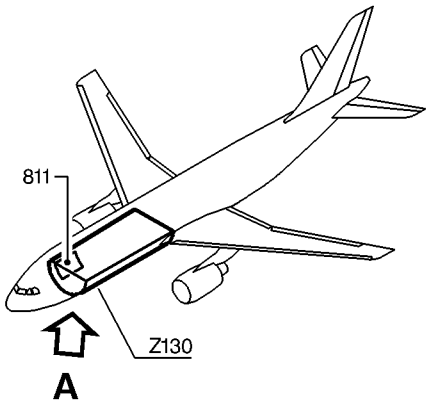
(4)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install FWD cargo-compartment partition at FR38.2 (Ref. 53-10-55, P. Block 401).

(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).



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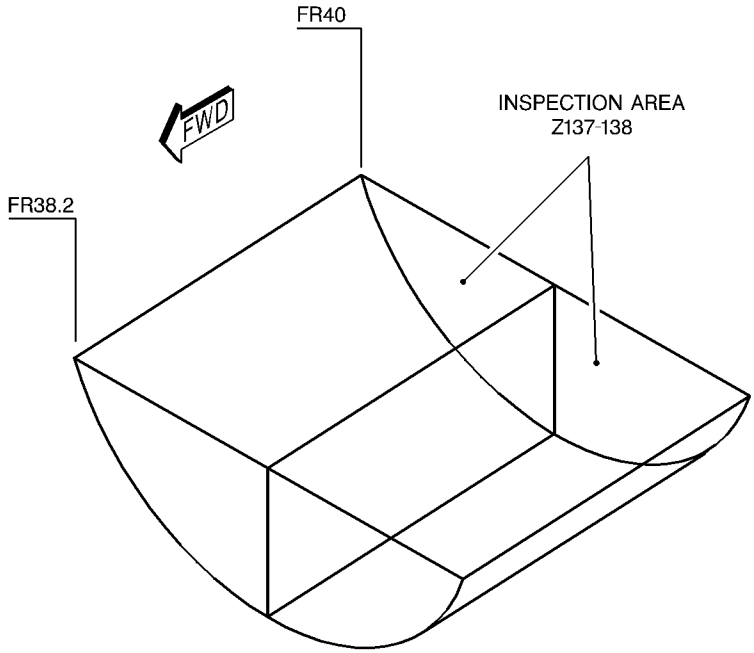

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Bay Aft of FWD Cargo Compartment - Inspection Area - Zones 137-138
Figure 606

R

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 7. Detailed Inspection of Exposed EWIS Within Center Wing Box (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of exposed EWIS within the zone.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.5 m (8 ft. 3 in.)
(2)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-29, P. Block 401	Center Tank Manhole Cover (147AZ, 148AZ)
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
R - ESPM 205212	

C. Procedure

(Ref. Fig. 607)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 141(142).

(d)Open main gear main door 734(744) (Ref. 32-12-11, P. Block 301).

(e)Remove center-tank manhole cover 147AZ(148AZ) (Ref. 28-11-29, P. Block 401).

(2)Detailed inspection of exposed wiring within center wing box

(a)Do a detailed inspection of the wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation
R (Ref. ESPM 205212).

1 On 2S wiring route: fuel quantity indication.

NOTE : Pay special attention to evidence of clamp cracked.

NOTE : Use a mirror if necessary.

(3)Close-up

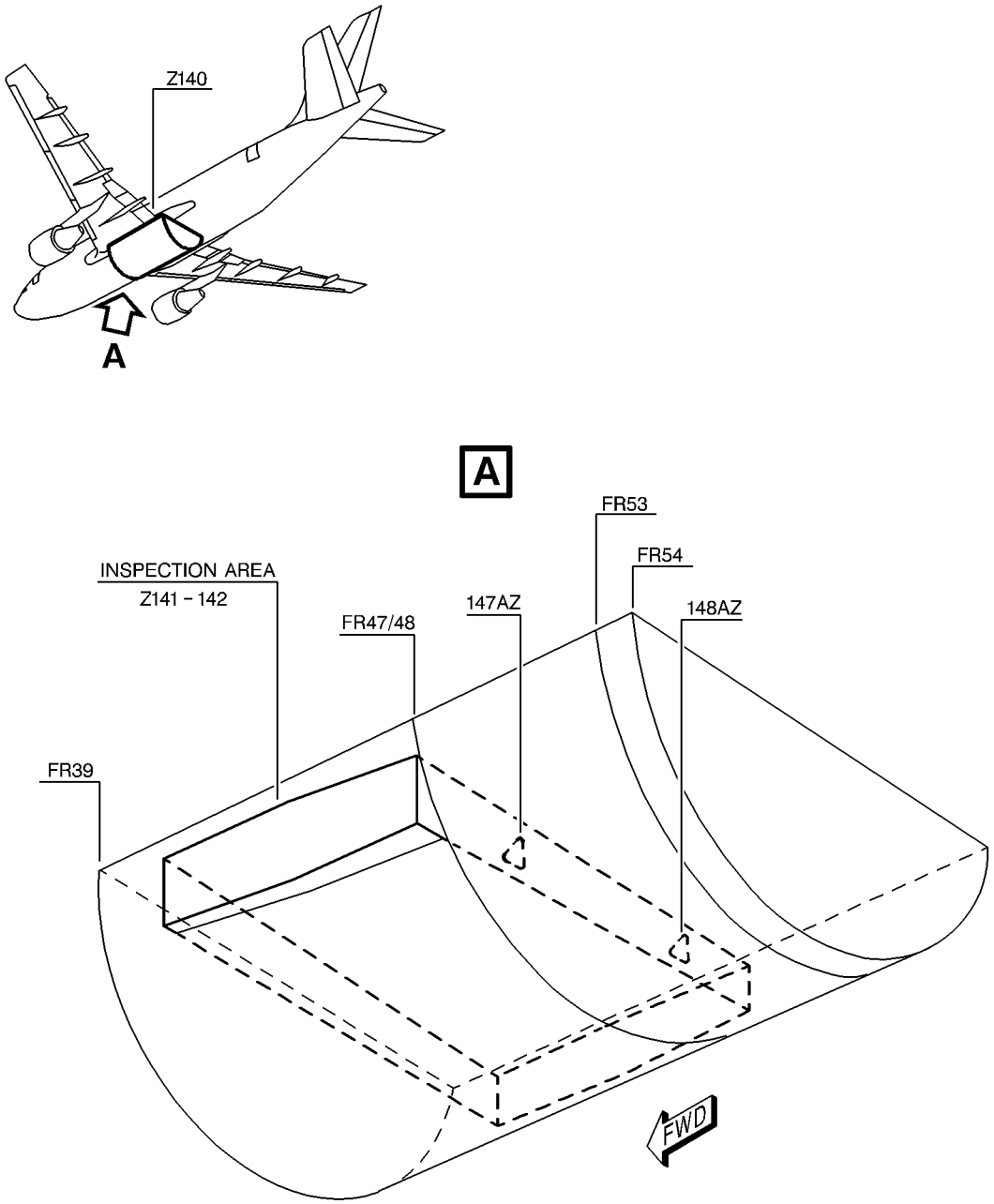
(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install center-tank manhole cover 147AZ(148AZ) (Ref. 28-11-29, P. Block 401).

(c)Close main gear main door 734(744) (Ref. 32-12-11, P. Block 301).

(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(g)Remove access platform.



BM5 24 92 00 6 ATM0 00

Center Wing Box - Inspection Area - Zones 141-142
Figure 607

R

R 8. General Visual Inspection of All EWIS Installed in C/B Box 923VU (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of all EWIS installed in C/B Box 923VU.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-55-10, P. Block 201	AFT Cargo Compartment Linings
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 53-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 608)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at AFT cargo compartment door 812.

(d)Open AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove sidewall and ceiling panels between FR61 and FR62 (Ref. 25-55-10, P. Block 201).

(2)General visual inspection of all wiring installed in C/B Box 923VU

(a)Do a visual inspection of the wiring to make sure that there is no
R overheating and discoloration (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

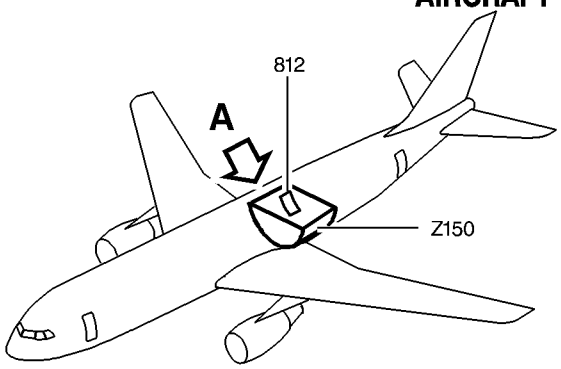
(b)Install sidewall and ceiling panels between FR61 and FR62 (Ref. 25-55-10, P. Block 201).

(c)Remove door actuator safety lock from AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(d)Close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.



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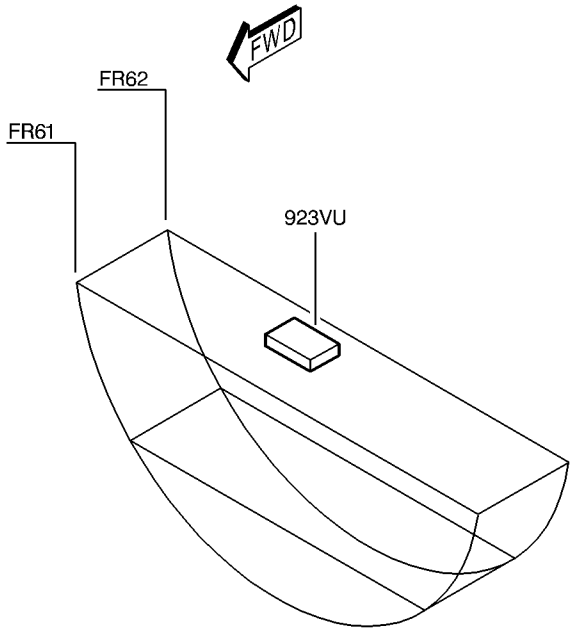


BM5 24 92 00 6 AUM0 00

923VU Location
Figure 608

R

**ON A/C 101-200,

R 9. General Visual Inspection of All EWIS Installed at the ACT(s) in AFT Cargo
R Compartment (EWIS)

A. Reason for the Job
R The purpose of this procedure is to do an inspection of all EWIS installed in the ACT(s).
NOTE : You can do this task when you remove/install the Additional Center Tank(s) (ACT).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-36, P. Block 401	Additional Center Tank
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 53-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
R - ESPM 205211	

C. Procedure

**ON A/C 001-100,

9. Not Applicable

**ON A/C 101-200,

(Ref. Fig. 609)

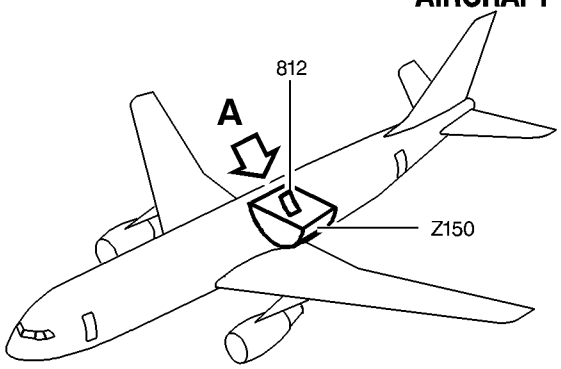
**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

(Ref. Fig. 610)

**ON A/C 101-200,

(1)Job set-up



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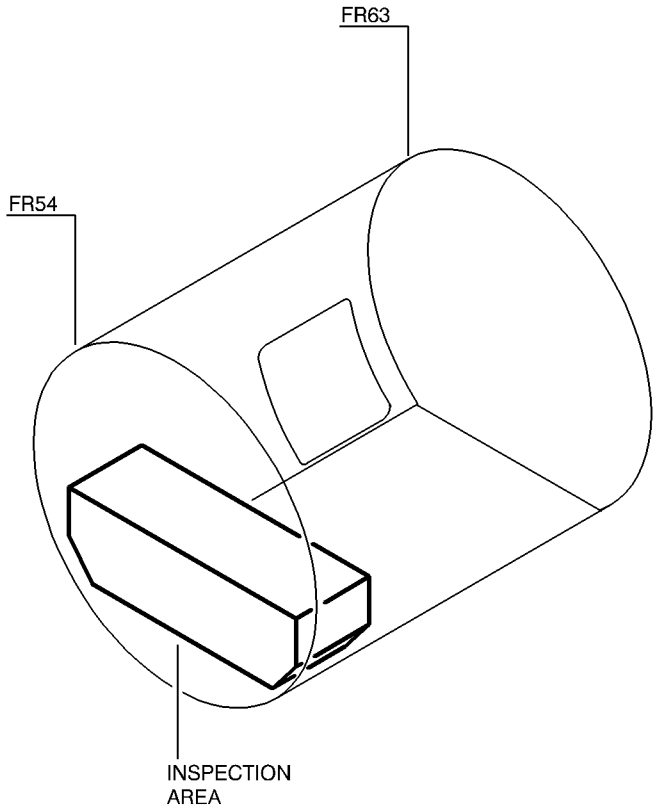

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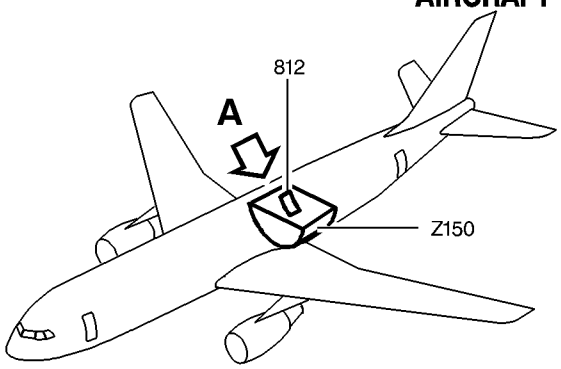
Additional Center Tank - Inspection Area - Zones 151-152
Figure 609

R



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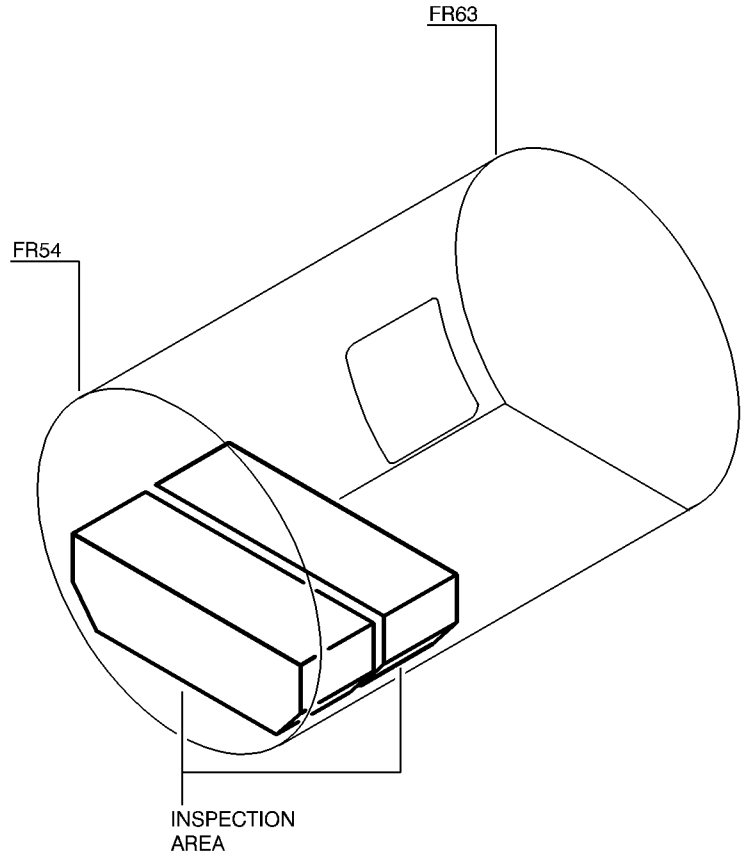


BM5 24 92 00 6 AYM0 00

Additional Center Tank - Inspection Area - Zones 151-152
Figure 610

R

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at AFT cargo compartment door 812.
(d)Open AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove additional center tank from AFT cargo compartment (Ref. 28-11-36, P. Block 401).

(2)General visual inspection of all wiring installed at the ACT(s)
(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation (Ref. ESPM 205211).
NOTE : Use a flash light or a mirror if necessary.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install additional center tank in AFT cargo compartment (Ref. 28-11-36, P. Block 401).
(c)Remove door actuator safety lock from AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

**ON A/C 101-200,

Post SB 28-2105 For A/C 101-200,

(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at AFT cargo compartment door 812.
(d)Open AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove the two additional center tanks from the AFT cargo compartment (Ref. 28-11-36, P. Block 401).
(2)General visual inspection of all wiring installed at the ACT(s)
(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
NOTE : Use a flash light or a mirror if necessary.
(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install the two additional center tanks in the AFT cargo compartment (Ref. 28-11-36, P. Block 401).
(c)Remove door actuator safety lock from AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

**ON A/C ALL

R 10.General Visual Inspection of EWIS Installed in Flight Compartment (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of EWIS installed in the flight compartment.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-11-11, P. Block 401	Captain Seat
- 25-11-12, P. Block 401	First Officer Seat
- 25-11-13, P. Block 401	Third Occupant Seat
- 25-11-14, P. Block 401	Supplementary Seat
- 25-11-15, P. Block 401	Folding Seat
- 25-13-11, P. Block 401	Ceiling Panels
- 25-13-21, P. Block 401	Upper Sidewall Panels
- 25-13-31, P. Block 401	Lower Sidewall Panels
- 52-10-00, P. Block 1	Passenger/Crew Doors
- 53-10-21, P. Block 401	Flight Compartment Floor Panels
R - ESPM 205211	

C. Procedure

(Ref. Fig. 611)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 831 (841).

(d)Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Remove Captain's seat (Ref. 25-11-11, P. Block 401).

(f)Remove First Officer's seat (Ref. 25-11-12, P. Block 401).

(g)Remove Third Occupant's seat (Ref. 25-11-13, P. Block 401).

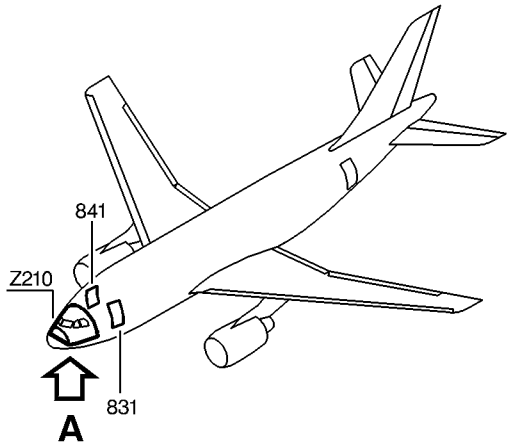
(h)Remove supplementary seat, if installed (Ref. 25-11-14, P. Block 401).

(j)Remove folding seat, if installed (Ref. 25-11-15, P. Block 401).

(k)Remove lining and furnishing panels installed in flight compartment:

- Ceiling panels (Ref. 25-13-11, P. Block 401).
- Upper sidewall panels (Ref. 25-13-21, P. Block 401).
- Lower sidewall panels (Ref. 25-13-31, P. Block 401).

(l)Remove flight compartment floor panels (Ref. 53-10-21, P. Block 401).



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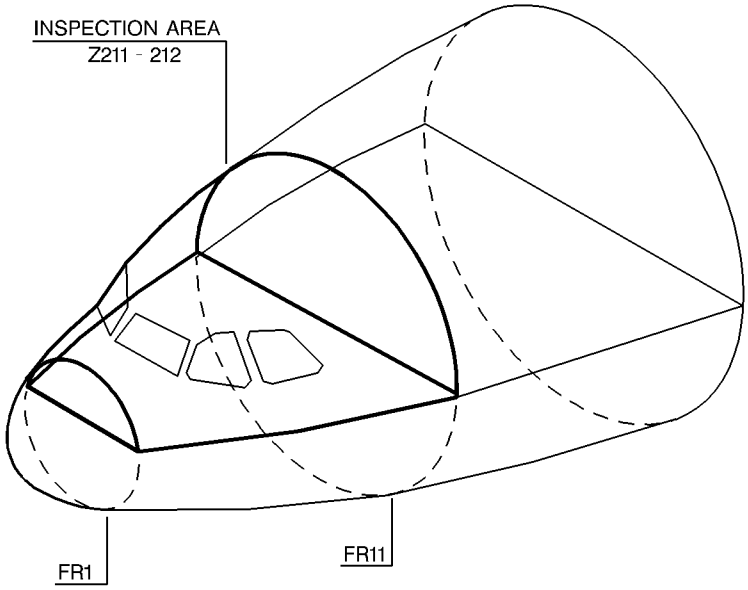

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Flight Compartment - Inspection Area - Zones 211-212
Figure 611

R

(m)Open panel(s) of 1VU, 2VU, 3VU, 4VU, 5VU, 6VU, 7VU, 8VU, 9VU, 11VU, 12VU, 13VU, 15VU, 20VU, 21VU, 22VU, 49VU, 50VU, 120VU, 219VU, 220VU, 221VU, 222VU and 241VU.

(2)General visual inspection of wiring installed in the flight compartment

(a)Do a visual inspection of the wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation

R (Ref. ESPM 205211).

1 On AC/DC feeder routes: 3G and 3E.

2 In AC/DC power distribution routes: 1P, 2P, 3P, 4P and 5P.

3 On engine control wiring routes: 1S, 2S and 3S.

4 On miscellaneous routes: 1M, 2M and 3M.

5 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.

6 On radio communication and navigation control wiring routes: 1C and 2C.

7 On radio communication and radio control, interphone, wiring routes: 1R, 2R and 3R.

NOTE : Use a flash light or a mirror if necessary.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install flight compartment floor panels (Ref. 53-10-21, P. Block 401).

(c)Close panel(s) of 1VU, 2VU, 3VU, 4VU, 5VU, 6VU, 7VU, 8VU, 9VU, 11VU, 12VU, 13VU, 15VU, 20VU, 21VU, 22VU, 49VU, 50VU, 120VU, 219VU, 220VU, 221VU, 222VU and 241VU.

(d)Install lining and furnishing panels removed in flight compartment:

- Ceiling panels (Ref. 25-13-11, P. Block 401).
- Upper sidewall panels (Ref. 25-13-21, P. Block 401).
- Lower sidewall panels (Ref. 25-13-31, P. Block 401).

(e)Install Captain's seat (Ref. 25-11-11, P. Block 401).

(f)Install First Officer's seat (Ref. 25-11-12, P. Block 401).

(g)Install Third Occupant's seat (Ref. 25-11-13, P. Block 401).

(h)Install supplementary seat, if removed (Ref. 25-11-14, P. Block 401).

(j)Install folding seat, if removed (Ref. 25-11-15, P. Block 401).

(k)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(l)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(m)Remove access platform.

R 11. General Visual Inspection of EWIS Inside Panel 120VU (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of EWIS inside the panel 120VU.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 612)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 831(841).

(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e) Open panels 131VU, 132VU and 133VU of rear panel 120VU.

(2) General visual inspection of wiring inside circuit breaker panels of rear panel 120VU

(a) Do a visual inspection of the wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and combustible accumulation
R (Ref. ESPM 205211).

1 On AC/DC feeder routes: 3G and 3E.

2 In AC/DC power distribution routes: 1P, 2P, 3P, 4P and 5P.

3 On engine control wiring routes: 1S, 2S and 3S.

4 On miscellaneous routes: 1M, 2M and 3M.

5 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.

6 On radio communication and navigation control wiring routes: 1C and 2C.

7 On radio communication and radio control, interphone, wiring routes: 1R, 2R and 3R.

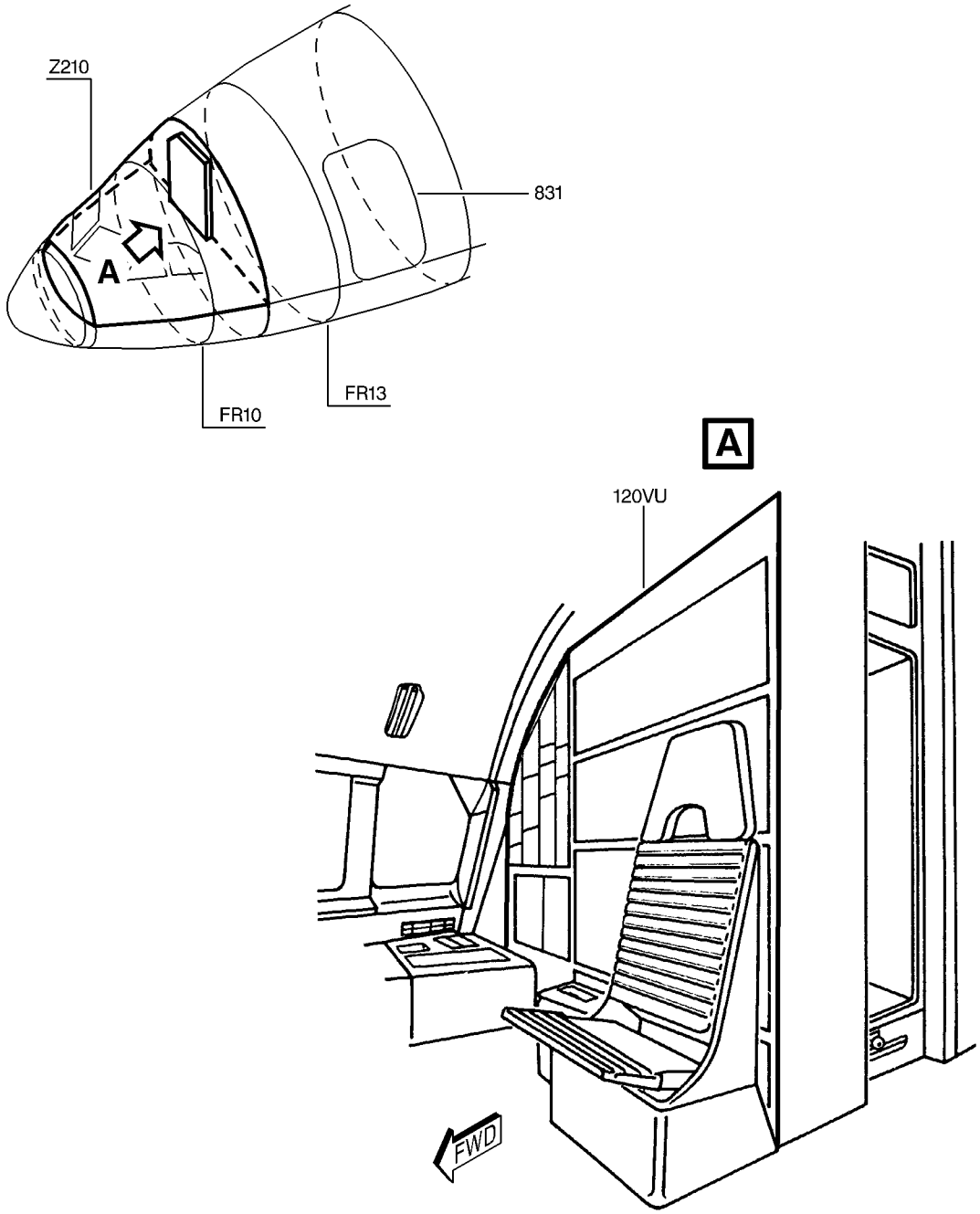
NOTE : Pay special attention to evidence of arcing, dust, clamps cracked and heat discoloration of circuit breaker housing.

NOTE : Use a flash light or a mirror if necessary.

(3) Close-up

(a) Make certain that the work area is clean and clear of tools and other items.

(b) Close panels 131VU, 132VU and 133VU of rear panel 120VU.



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120VU - Location
Figure 612

R

(c)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(e)Remove access platform.

R 12. General Visual Inspection of Circuit Breakers and EWIS Inside 800VU (EWIS)

A. Reason for the Job

The purpose of this procedure is to do an inspection of circuit breakers
R and EWIS inside 800VU.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 613)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 831(841).

(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e) Open circuit breaker panel 800VU in FWD passenger compartment.

(2) General visual inspection of circuit breakers and wiring inside 800VU

(a) Do a visual inspection of the circuit breakers and the wiring to make sure that there is no damage, corrosion, leaks, cracks, chafing and
R combustible accumulation (Ref. ESPM 205211).

1 On AC/DC feeder routes: 3G and 3E.

2 On AC/DC power distribution routes: 1P, 2P, and 3P.

3 On engine control wiring route: 3S.

4 On miscellaneous routes: 1M, 2M and 3M.

5 On interphone and public address wiring routes: 3R and 4R.

NOTE : Use a flash light or a mirror if necessary.

(3) Close-up

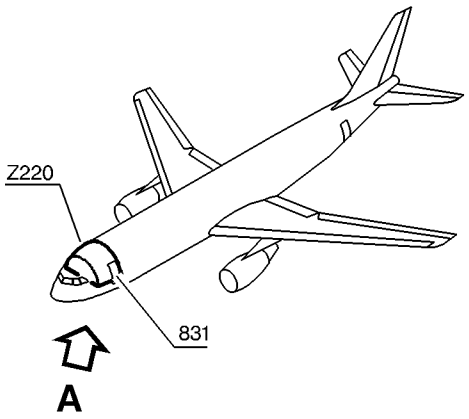
(a) Make certain that the work area is clean and clear of tools and other items.

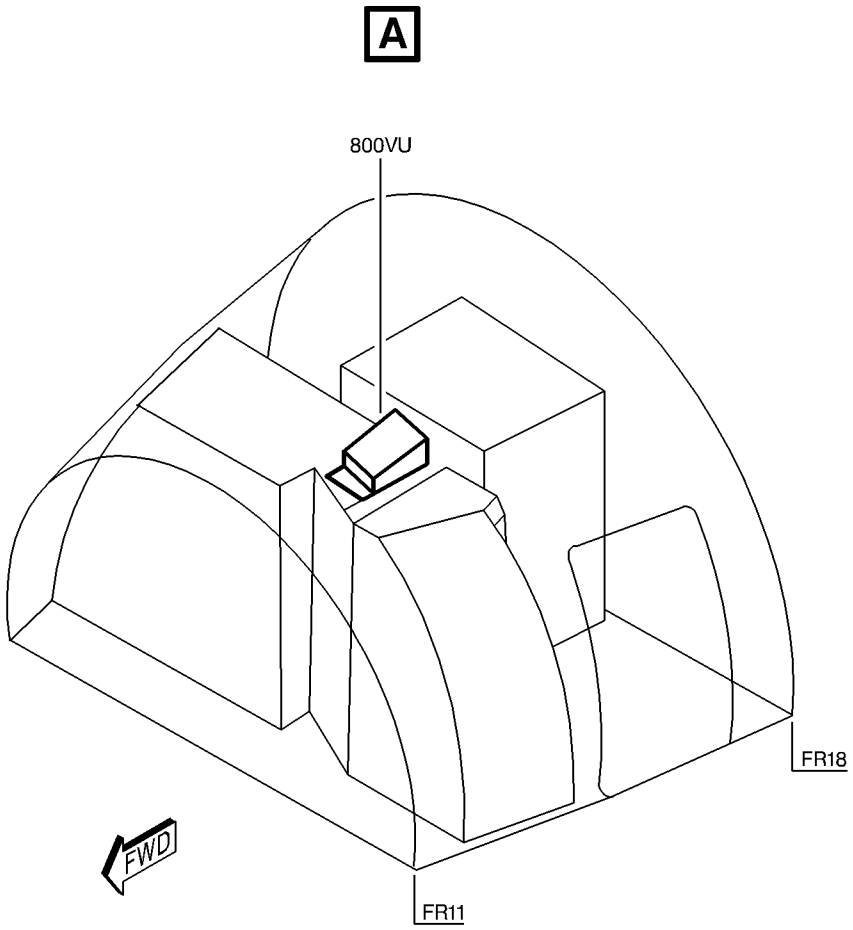
(b) Close circuit breaker panel 800VU.

(c) Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(d) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(e) Remove access platform.





BM5 24 92 00 6 BLM0 00

800VU - Location
Figure 613

R

R 13. General Visual Inspection of All EWIS Connections Between Seats and
R Aircraft, and of EWIS at Seats Installed as Far as Visible in FWD Main Deck
R Compartment Area (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS connections between seats and aircraft and the EWIS at the seats installed as far as visible in the FWD main deck compartment area.

NOTE : This task is applicable for A/C versions with seats only, and if electronically equipped.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 614)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 831(841).

(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e) Remove seat covers and easily removable seat cushions, if necessary between FR16A and FR39.

(2) General visual inspection of all wiring connections between seats and aircraft, and of wiring at seats installed as far as visible in FWD main deck compartment area

(a) Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

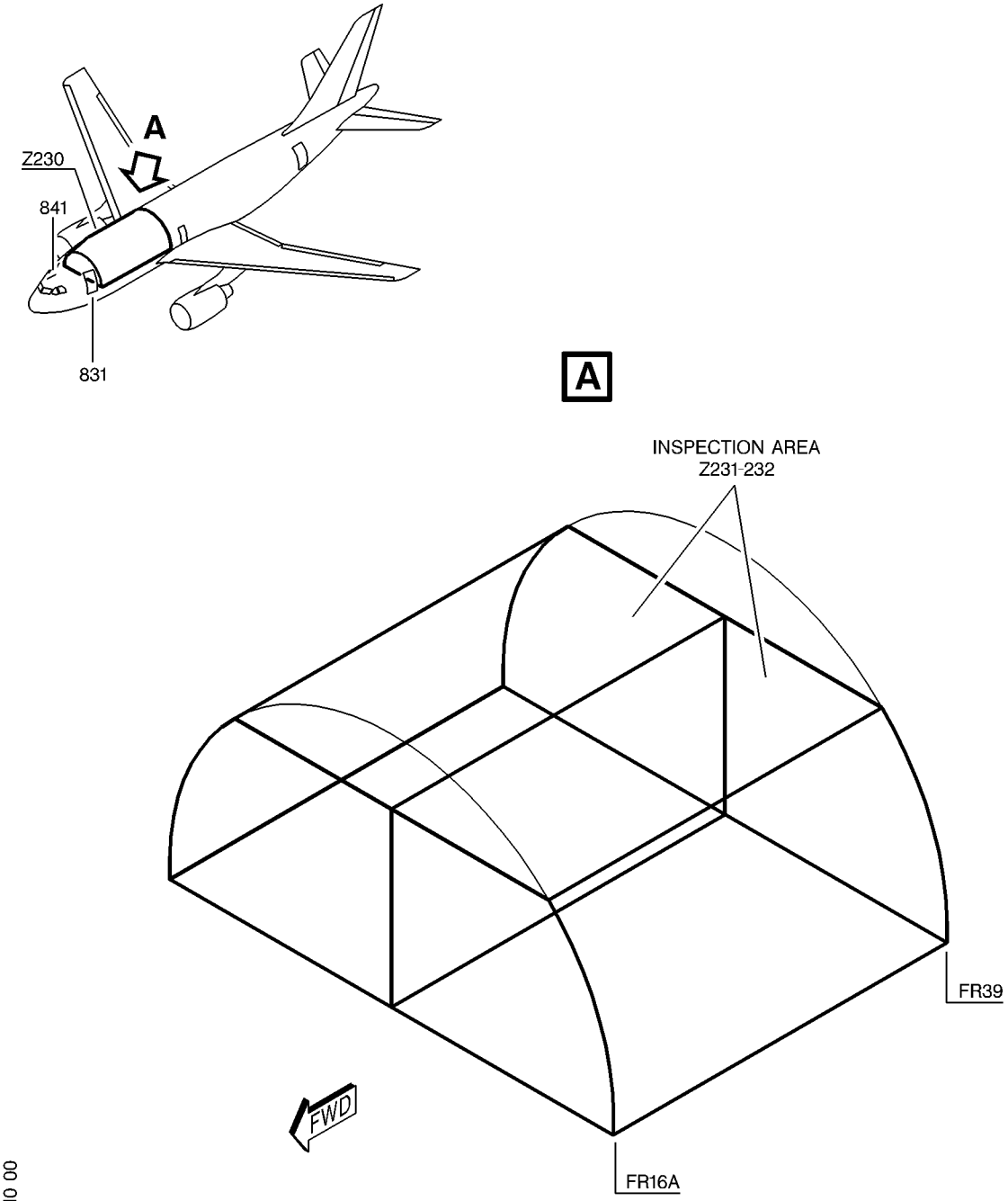
(3) Close-up

(a) Make certain that the work area is clean and clear of tools and other items.

(b) Install seat covers and easily removable seat cushions, if removed between FR16A and FR39.

(c) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d) Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).



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FWD Main Deck Compartment Area - Inspection Area - Zones 231-232
Figure 614

R

(e)Remove access platform.

R 14. General Visual Inspection of All EWIS Connections Between Seats and
R Aircraft, and of EWIS at Seats Installed as Far as Visible in Center Main
R Deck Compartment Area (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS connections between seats and aircraft, and the EWIS at the seats installed as far as visible in the center main deck compartment area.

NOTE : This task is applicable for A/C versions with seats only, and if electronically equipped.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 615)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 831(841).

(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e) Remove seat covers and easily removable seat cushions, if necessary between FR39 and FR54.

(2) General visual inspection of all wiring connections between seats and aircraft, and of wiring at seats installed as far as visible in the center main deck compartment area

(a) Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

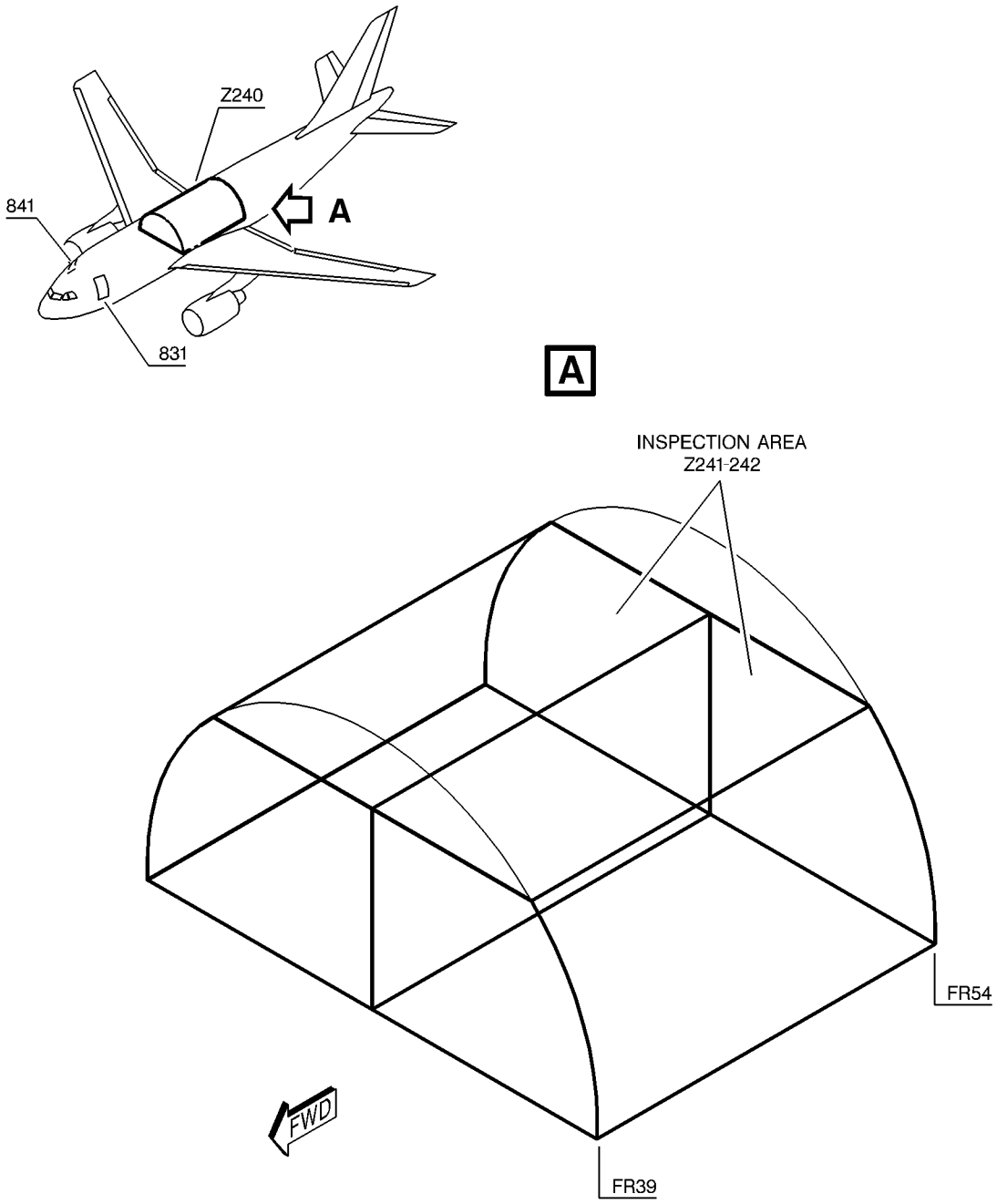
(3) Close-up

(a) Make certain that the work area is clean and clear of tools and other items.

(b) Install seat covers and easy removable seat cushions, if removed between FR39 and FR54.

(c) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d) Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).



BM5 24 92 00 6 BQM0 00

Center Main Deck Compartment - Inspection Area -
Zones 241-242
Figure 615

(e)Remove access platform.

R 15. General Visual Inspection of All EWIS Connections Between Seats and
R Aircraft, and of EWIS at Seats Installed as Far as Visible in Aft Main Deck
R Compartment Area (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS connections between seats and aircraft and the EWIS at the seats installed as far as visible in the aft main deck compartment area.

NOTE : This task is applicable for A/C versions with seats only, and if electronically equipped.

R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 616)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 833(843).

(d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e) Remove seat covers and easy removable seat cushions, if necessary between FR54 and FR73A.

(2) General visual inspection of all wiring connections between seats and aircraft and the wiring at the seats installed as far as visible in aft main deck compartment area

(a) Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

NOTE : Use a flash light or a mirror if necessary.

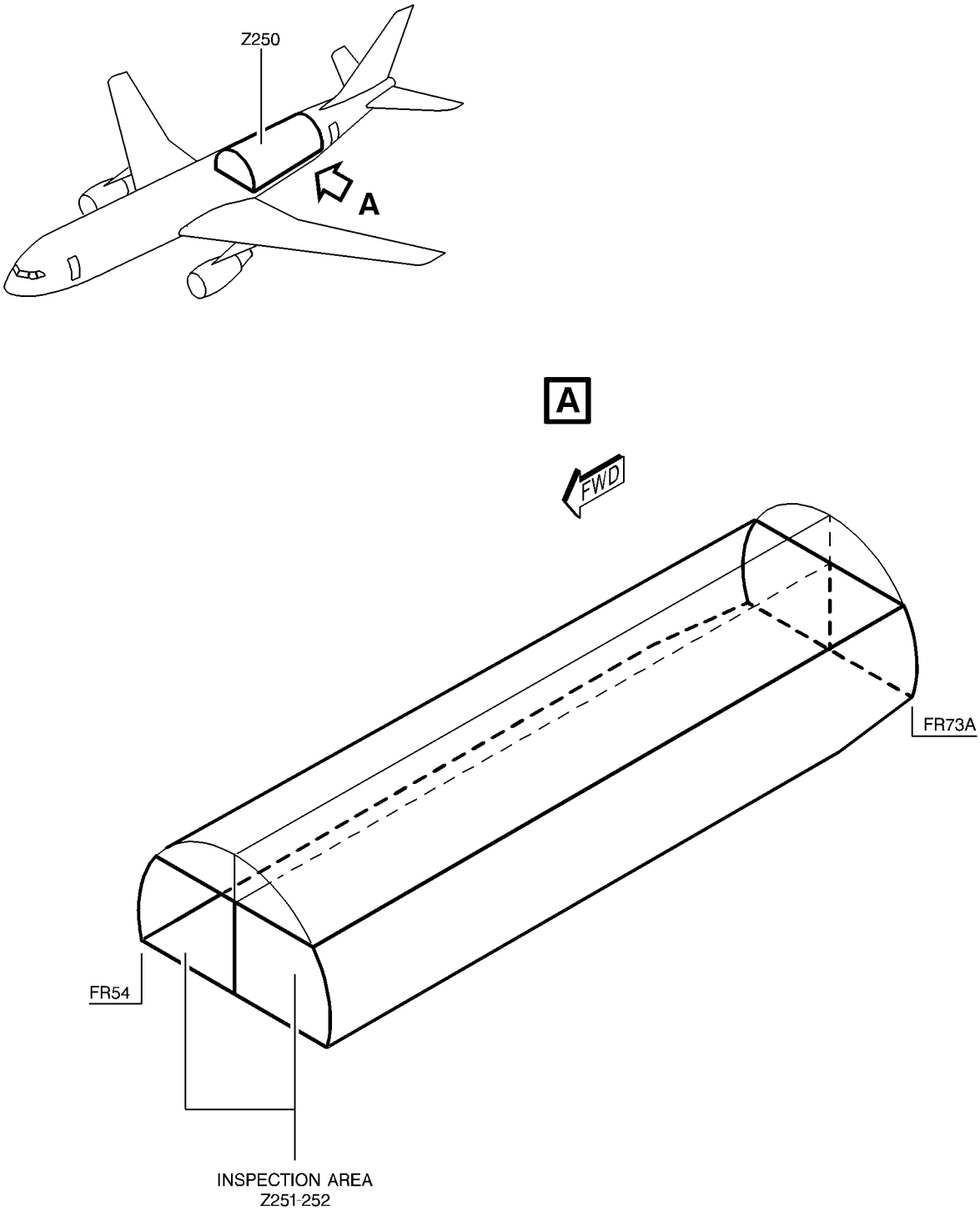
(3) Close-up

(a) Install seat covers and easily removable seat cushions, if removed between FR54 and FR73A.

(b) Make certain that the work area is clean and clear of tools and other items.

(c) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d) Close the aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).



Aft Main Deck Compartment Area - Inspection Area -
Zones 251-252
Figure 616

(e)Remove the access platform.

R 16. General Visual Inspection of EWIS Inside Panel 811VU (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R EWIS inside panel 811VU.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

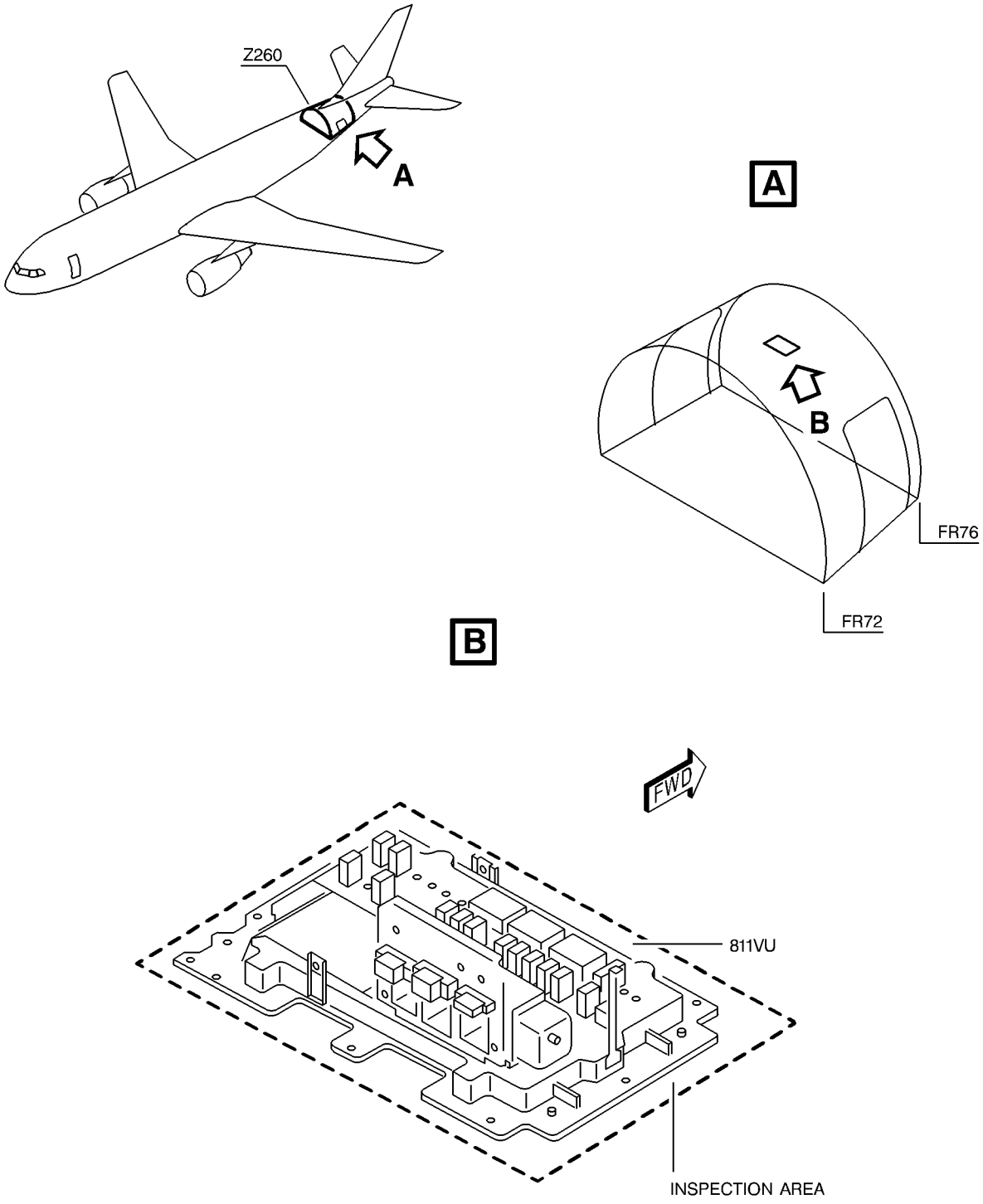
C. Procedure

(Ref. Fig. 617)

(1) Job set-up
  (a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
  (b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
  (c) Put an access platform in position at zone 833(843).
  (d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
  (e) Open C/B panel 811VU at zone 260 between FR74 and FR76.

(2) General visual inspection of wiring inside panel 811VU
  (a) Do a visual inspection of wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
  NOTE : Use a flash light or a mirror if necessary.

(3) Close-up
  (a) Make certain that the work area is clean and clear of tools and other items.
  (b) Close C/B panel 811VU at zone 260 between FR74 and FR76.
  (c) Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
  (d) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
  (e) Remove access platform.



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Aft Main Deck Utility Areas - Circuit Breaker Panel 811VU -
Inspection Area - Zone 260
Figure 617

R 17. General Visual Inspection of APU Feed Line and Power G, E and P Route
R EWIS in Ceiling Area (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R APU feed line and power G, E and P route EWIS in ceiling area.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-13, P. Block 401	Utility Area Ceiling Panels
- 25-33-13, P. Block 401	Aft Galley Unit
- 25-43-11, P. Block 401	Aft Lavatory
- 25-43-71, P. Block 401	Lavatory - Q (L)
- 25-43-75, P. Block 401	Lavatory - G (R)
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205211	

C. Procedure

(Ref. Fig. 618)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 833(843).

(d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e) Remove linings and furnishings between FR73A and FR80/82:
- Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401).

(f) Remove equipment installed between FR73A and FR80/82, if necessary:
- Aft galley units, if installed (Ref. 25-33-13, P. Block 401).
- Aft lavatories, if installed (Ref. 25-43-11, P. Block 401), (Ref. 25-43-71, P. Block 401) or (Ref. 25-43-75, P. Block 401).

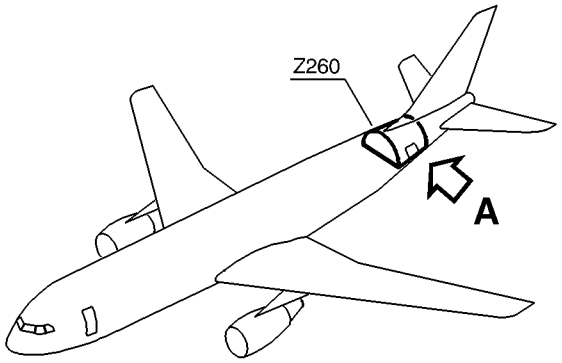
(2) General visual inspection of APU feed line and power G, E and P route wiring in ceiling area

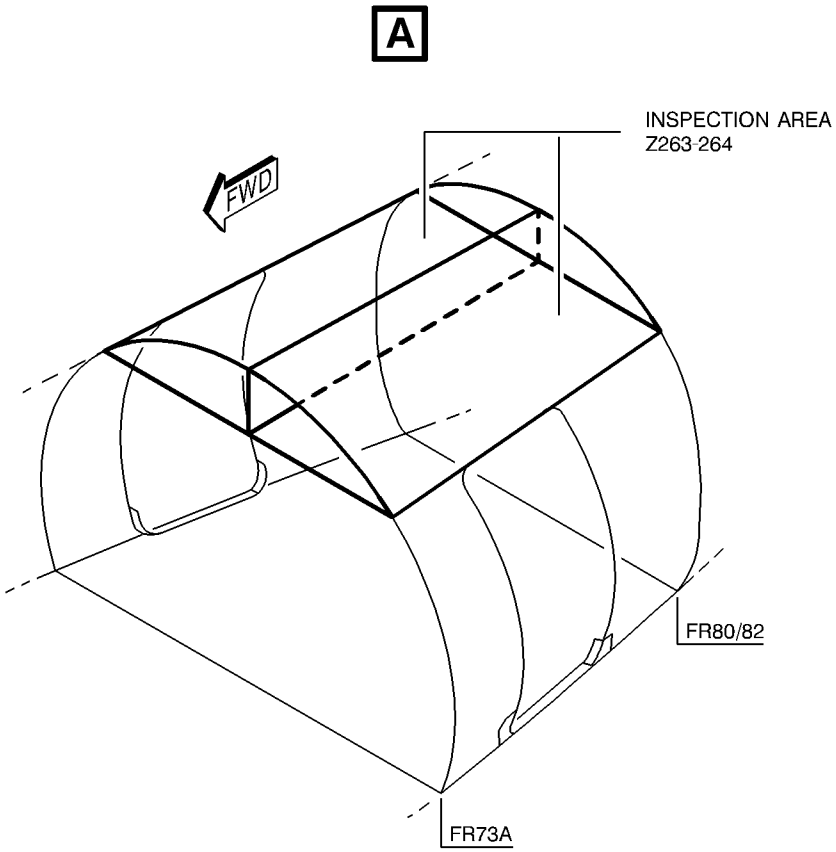
(a) Do a visual inspection of wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

1 On AC/DC feeder routes: 3G and 3E - APU generator feeder and energization.

2 On AC/DC power distribution routes: 1P, 2P and 3P - Control toilet vacuum system and vacuum cleaner.

NOTE : Use a flash light or a mirror if necessary.





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Aft Main Deck Utility Overhead Compartment
Inspection Area - Zones 263-264
Figure 618

(3)Close-up
(a)Install equipment between FR73A and FR80/82, if removed:
- Aft galley units (Ref. 25-33-13, P. Block 401).
- Aft lavatories (Ref. 25-43-11, P. Block 401),
(Ref. 25-43-71, P. Block 401) or (Ref. 25-43-75, P. Block 401).
(b)Install linings and furnishings between FR73A and FR80/82:
- Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401).
(c)Make certain that the work area is clean and clear of tools and other items.
(d)Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 18. Detailed Inspection of APU Feeders and Starter Cable at Rear Bulkhead
R EWIS Pressure Seals (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a detailed inspection of APU
R feeders and starter cable at rear bulkhead EWIS pressure seals.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-13, P. Block 401	Utility Area Ceiling Panels
- 52-10-00, P. Block 1	Passenger/Crew Doors
R - ESPM 205212	

C. Procedure

(Ref. Fig. 618)

(1) Job set-up
- (a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
- (b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
- (c) Put an access platform in position at zone 833(843).
- (d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
- (e) Remove linings and furnishings between FR73A and FR80/82:
  - Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401).

(2) Detailed inspection of APU feeders and starter cable at rear bulkhead wiring pressure seals
- (a) Do a visual inspection of the wiring between FR79 and FR80/82 to make sure that there are no signs of ageing, alteration, overheating,
R scaling and deformation (Ref. ESPM 205212).
  1 On AC/DC feeder routes: 3G and 3E - APU generator feeder and energization.
  NOTE : Use a flash light or a mirror if necessary.

(3) Close-up
- (a) Install linings and furnishings between FR73A and FR80/82:
  - Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401).
- (b) Make certain that the work area is clean and clear of tools and other items.
- (c) Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
- (d) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
- (e) Remove access platform.

R 19. General Visual Inspection of G Route EWIS Within APU and
R Accessory Compartment (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of G
R route EWIS within the zone.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 7 m (23 ft.)
(2)	Circuit Breaker Safety Clips and Tags
(3)	Warning Notice
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
R - ESPM 205211	

C. Procedure

(Ref. Fig. 619)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
124VU	APU/START	50KA	E70

(d) Put a warning notice in position in flight compartment, prohibiting start of APU.

(e) Put an access platform in position at fuselage tail cone.

(f) Open APU access doors 315AL and 316AR.

(2) General visual inspection of G route wiring within APU and accessory compartment

(a) Do a visual inspection of wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

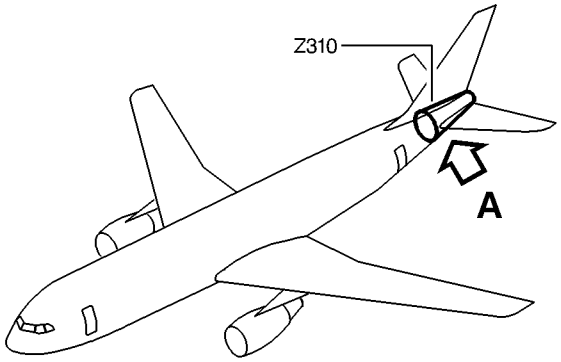
1 On AC/DC feeder routes: APU feeder (G and E routes, generator route).

2 On flight control wiring route: APU monitoring.

NOTE : Use a flash light or a mirror if necessary.

(3) Close-up

(a) Make certain that the work area is clean and clear of tools and other items.



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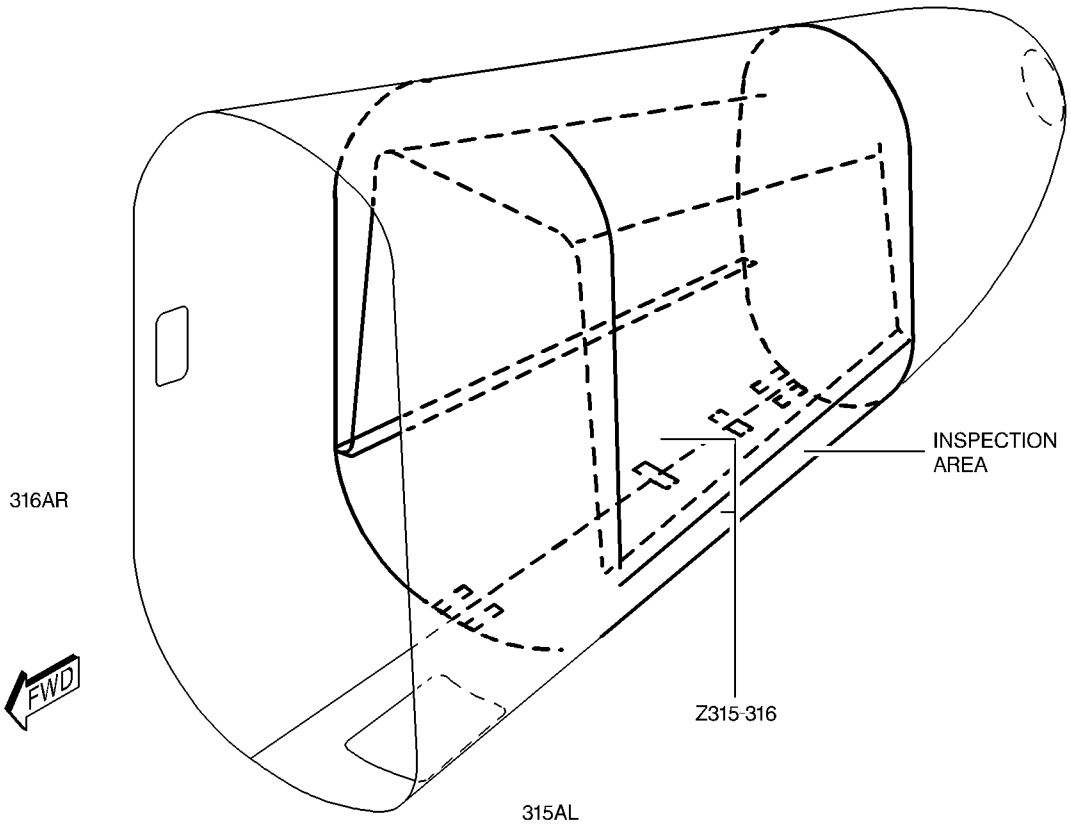

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APU and Accessory Compartment - Inspection Area - Zones 315-316
Figure 619

(b)Remove safety clip and tag, and close circuit breaker 50KA.
(c)Close APU access doors 315AL and 316AR.
(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(e)Remove warning notice.
(f)Remove access platform.

R 20. Detailed Inspection of Horizontal Stabilizer Center Section Exposed
R EWIS Inside Fuel Tank (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a detailed inspection of horizontal
R stabilizer center section exposed EWIS inside the fuel tank.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

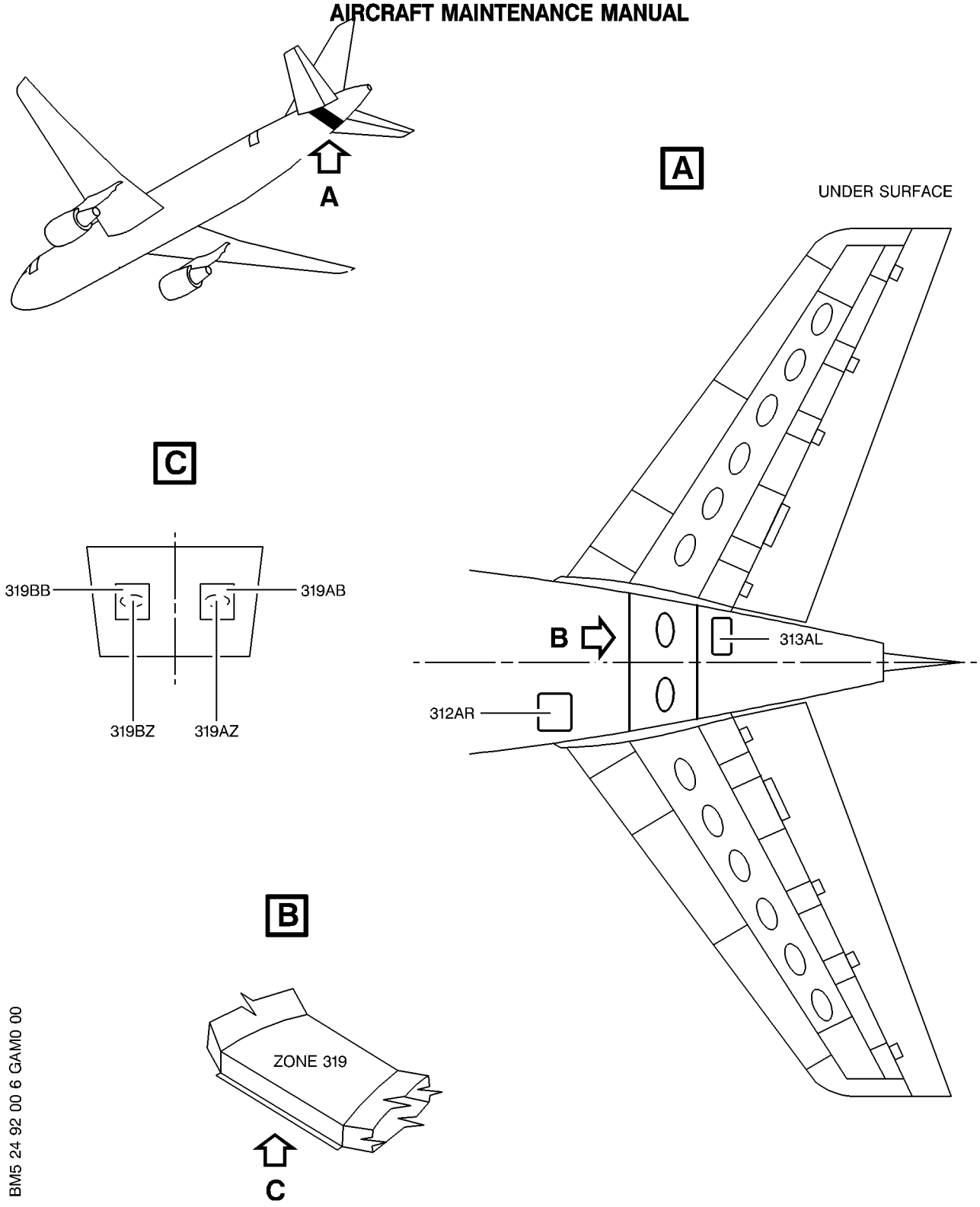
ITEM	DESIGNATION
(1)	Access Platform 7 m (23 ft.)
(2)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(3)	Warning Notice
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-33, P. Block 401	Trim Tank Manhole Covers
- 28-11-35, P. Block 401	Vapor Seal
R - ESPM 205212	

C. Procedure

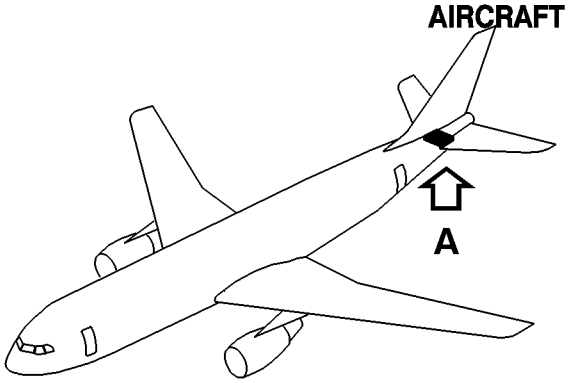
(Ref. Fig. 620)
(Ref. Fig. 621)

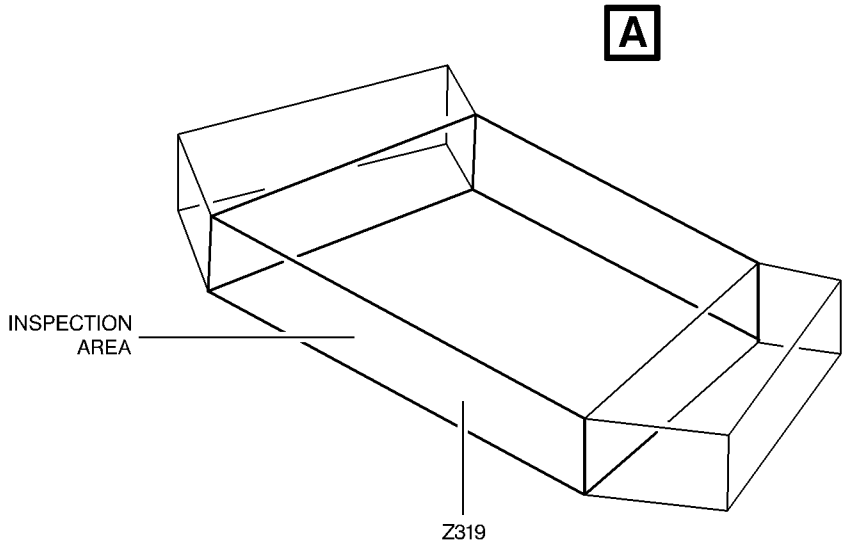
(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Move horizontal stabilizer to 3 deg. A/C nose down position and install locking equipment P/N 97A27302009000 on pitch trim control wheel.
(d) Put a warning notice in position in flight compartment to prohibit operation of pitch control system.
(e) Put an access platform in position at horizontal stabilizer.
(f) Open access doors 312AR and 313AL.
(g) Remove vapor seals 319AB and 319BB (Ref. 28-11-35, P. Block 401).
(h) Remove manhole covers 319AZ and 319BZ inside of the fuselage (Ref. 28-11-33, P. Block 401).

(2) Detailed inspection of horizontal stabilizer center section exposed wiring inside fuel tank
(a) Do a visual inspection of the wiring to make sure that there is no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205212).
1 On route: 1S (Fuel quantity indicating circuit and fuel high and low level indicating circuit).
NOTE : Use a flash light or a mirror if necessary.



Horizontal Stabilizer Center Section - Access Panels - Zone 319
Figure 620





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Horizontal Stabilizer Center Section - Inspection Area -
Zone 319
Figure 621

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install manhole covers 319AZ and 319BZ inside of the fuselage (Ref. 28-11-33, P. Block 401).
(c)Install vapor seals 319AB and 319BB (Ref. 28-11-35, P. Block 401).
(d)Close access doors 312AR and 313AL.
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove locking equipment P/N 97A27302009000.
(g)Remove warning notice.
(h)Remove access platform.

R 21. Detailed Inspection of Horizontal Stabilizer Spar Box Exposed
R EWIS Inside Fuel Tank (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a detailed inspection of horizontal
R stabilizer spar box exposed EWIS inside the fuel tank.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 8.3 m (27 ft.)
(2)97A27302009000	Locking Equipment - Pitch Trim Control Wheel
(3)	Warning Notice
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-33, P. Block 401	Trim Tank Manhole Covers
- 28-12-33, P. Block 401	Trim Tank NACA Intake and Vent Protector
R - ESPM 205212	

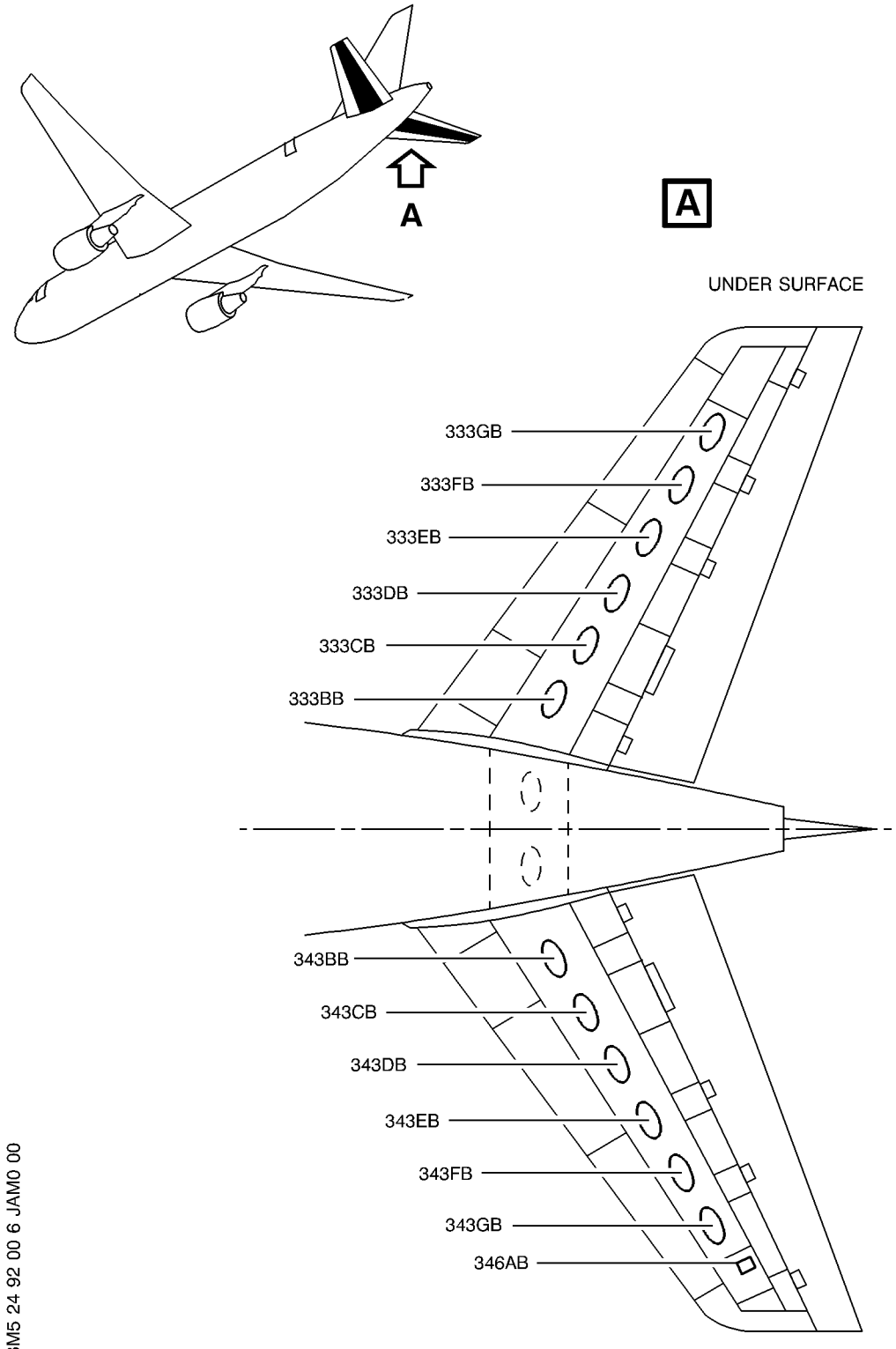
C. Procedure

(Ref. Fig. 622)
(Ref. Fig. 623)

(1)Job set-up
- (a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
- (b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
- (c)Move horizontal stabilizer to 3 deg. A/C nose down position and install locking equipment P/N 97A27302009000 on pitch trim control wheel.
- (d)Put a warning notice in position in flight compartment to prohibit pitch control operation.
- (e)Put an access platform in position at horizontal stabilizer.
- (f)Remove manhole covers (Ref. 28-11-33, P. Block 401):
  - 333GB, 333FB, 333EB, 333DB, 333CB, 333BB, 343GB, 343FB, 343EB, 343DB, 343CB and 343BB.
- (g)Remove NACA intake panel 346AB (Ref. 28-12-33 P. Block 401).

(2)Detailed inspection of horizontal stabilizer spar box exposed wiring inside fuel tank
- (a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205212).
  1 On route: 1S (Fuel quantity indicating circuit and fuel high and low level indicating circuit).
  NOTE : Use a flash light or a mirror if necessary.

(3)Close-up



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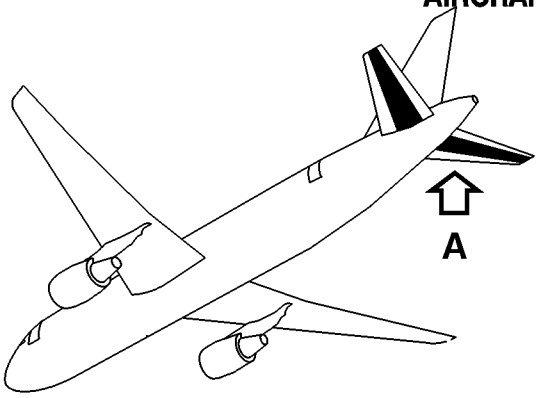
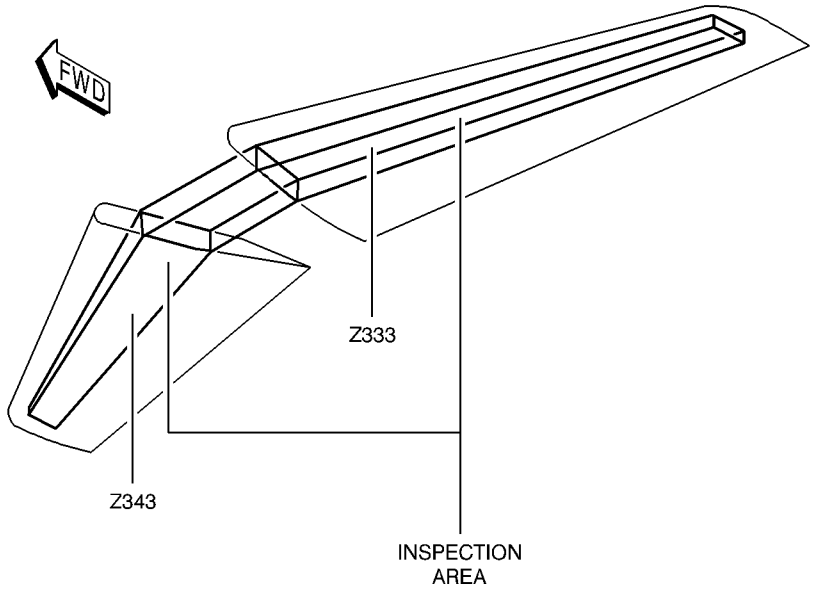
Horizontal Stabilizer Spar Box - Access Panels - Zones 333-343
Figure 622





BM5 24 92 00 6 KAM0 00

Horizontal Stabilizer Spar Box - Inspection Area -
Zones 333-343
Figure 623

(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install NACA intake panel 346AB (Ref. 28-12-33 P. Block 401).
(c)Install manhole covers (Ref. 28-11-33, P. Block 401):
- 333GB, 333FB, 333EB, 333DB, 333CB, 333BB, 343GB, 343FB, 343EB, 343DB, 343CB and 343BB.
(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(e)Remove locking equipment P/N 97A27302009000.
(f)Remove warning notice.
(g)Remove access platform.

R 22. General Visual Inspection of EWIS Within Slat Track/Screw Jack Area
R Installed in Fixed Leading Edge Area (From Rib 2 to Rib 9) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R EWIS within slat track/screw jack area.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 3.5 m (11 ft.)
(2)98A27503003000	Flap/Slat Control Lever Safety Guard
(3)	Warning Notices
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
R - ESPM 205211	

C. Procedure

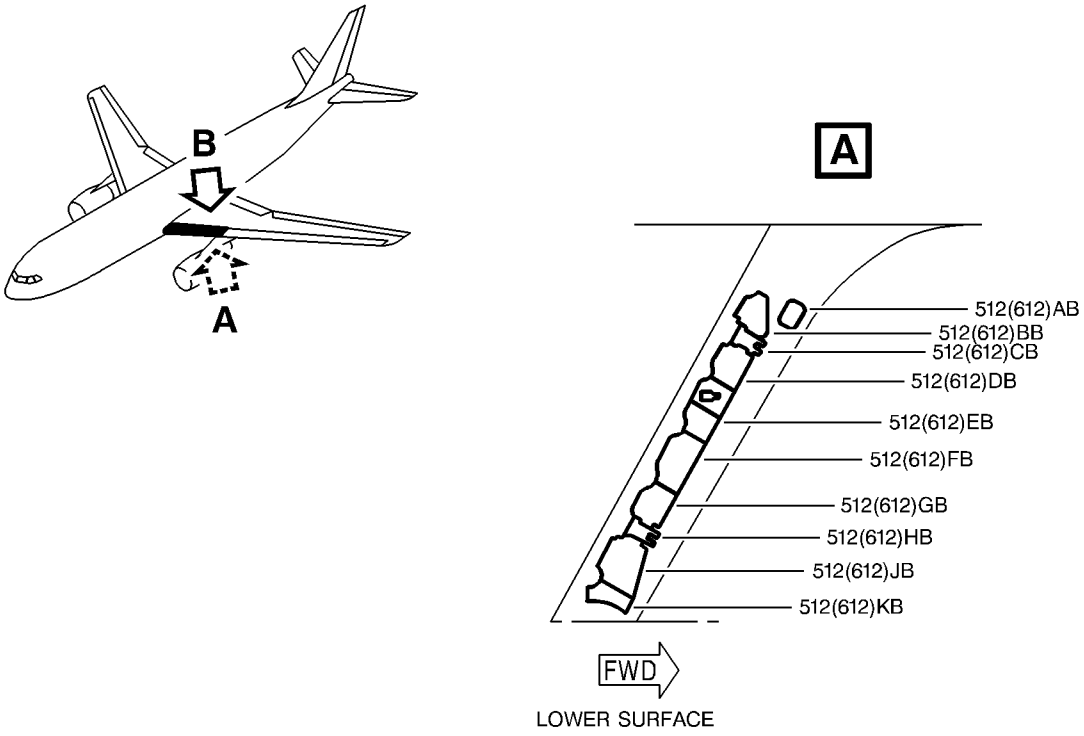
(Ref. Fig. 624)
(Ref. Fig. 625)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301).
(d)Install safety guard 98A27503003000 on flap/slat control lever.
(e)Put warning notices in position in flight compartment to prohibit slat and flap operation.
(f)Put an access platform in position below the wings.
(g)Remove leading edge access panels:
- On LH wing, remove access panels 512AB, 512BB, 512CB, 512DB, 512EB, 512FB, 512GB, 512HB, 512JB, 512KB and 512AT.
- On RH wing, remove access panels 612AB, 612BB, 612CB, 612DB, 612EB, 612FB, 612GB, 612HB, 612JB, 612KB and 612AT.

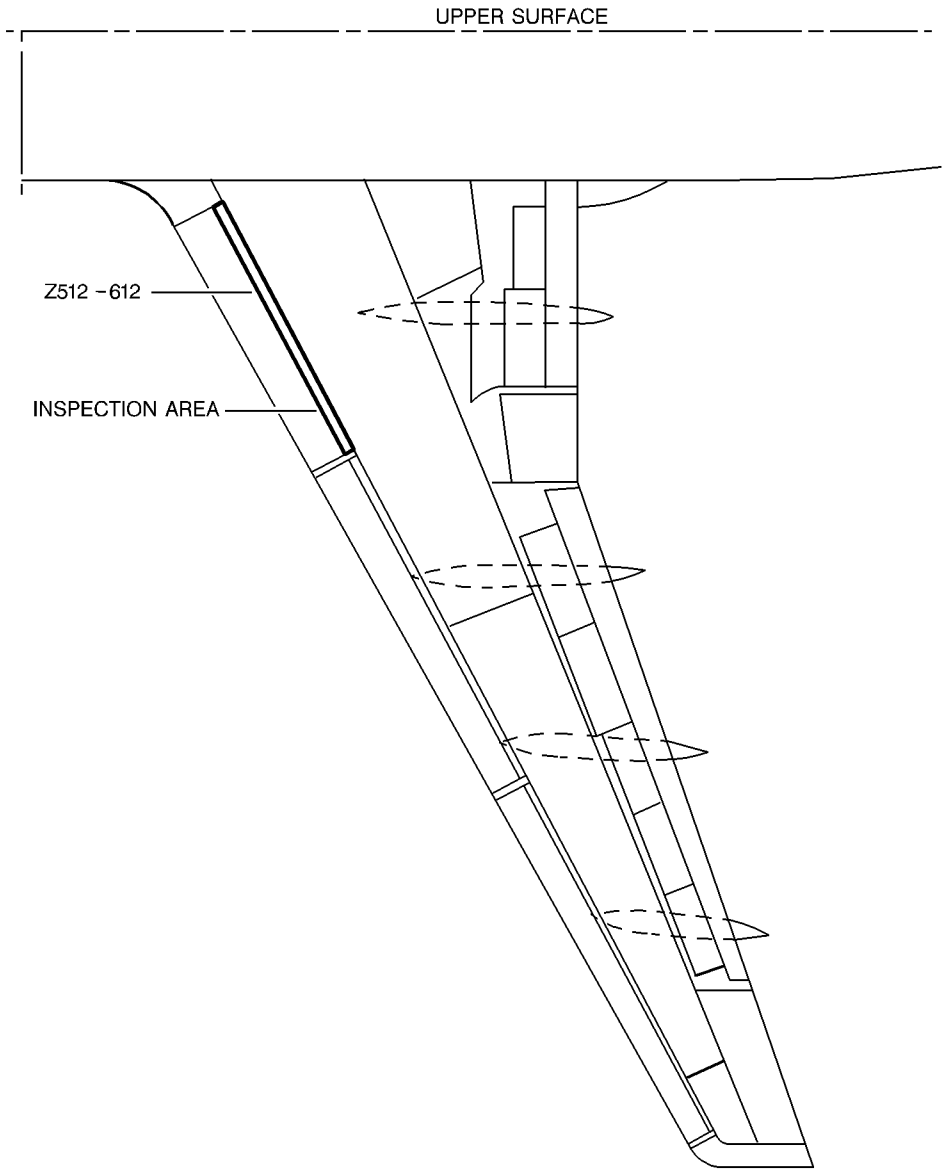
(2)General visual inspection of wiring within slat track/screw jack area

(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
1 On AC/DC feeder routes: 1G and 2G.
2 On engine control wiring routes: 1S and 2S.
3 On miscellaneous routes: 1M and 2M.
4 On other wiring routes: 1E, 2E, 3R, 1S and 2S (Generator energization, interphone wiring and sensitive system).
NOTE : Use a flash light or a mirror if necessary.



BM5 24 92 00 6 MAM0 00

Fixed Leading Edge Area - Access Panels - Zones 512-612
Figure 624



BM5 24 92 00 6 NAM0 00

Fixed Leading Edge Area - Access Panels - Zones 512-612
Figure 625

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install leading edge access panels:
- On LH wing, install access panels 512AB, 512BB, 512CB, 512DB, 512EB, 512FB, 512GB, 512HB, 512JB, 512KB and 512AT.
- On RH wing, install access panels 612AB, 612BB, 612CB, 612DB, 612EB, 612FB, 612GB, 612HB, 612JB, 612KB and 612AT.

(c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(d)Remove locking equipment P/N 97A27302009000 from flap/slat control lever.
(e)Remove warning notices.
(f)Fully retract slats (Ref. 27-80-00, P. Block 301).
(g)Remove access platform.

R 23. General Visual Inspection of All EWIS Within Slat Track/Screw Jack Area
R Installed in Center Fixed Leading Edge Area (From Rib 9 to Rib 19) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R all EWIS within slat track/screw jack area.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 3.5 m (11 ft.)
(2)98A27503003000	Flap/Slat Control Lever Safety Guard
(3)	Warning Notices
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
R - ESPM 205211	

C. Procedure

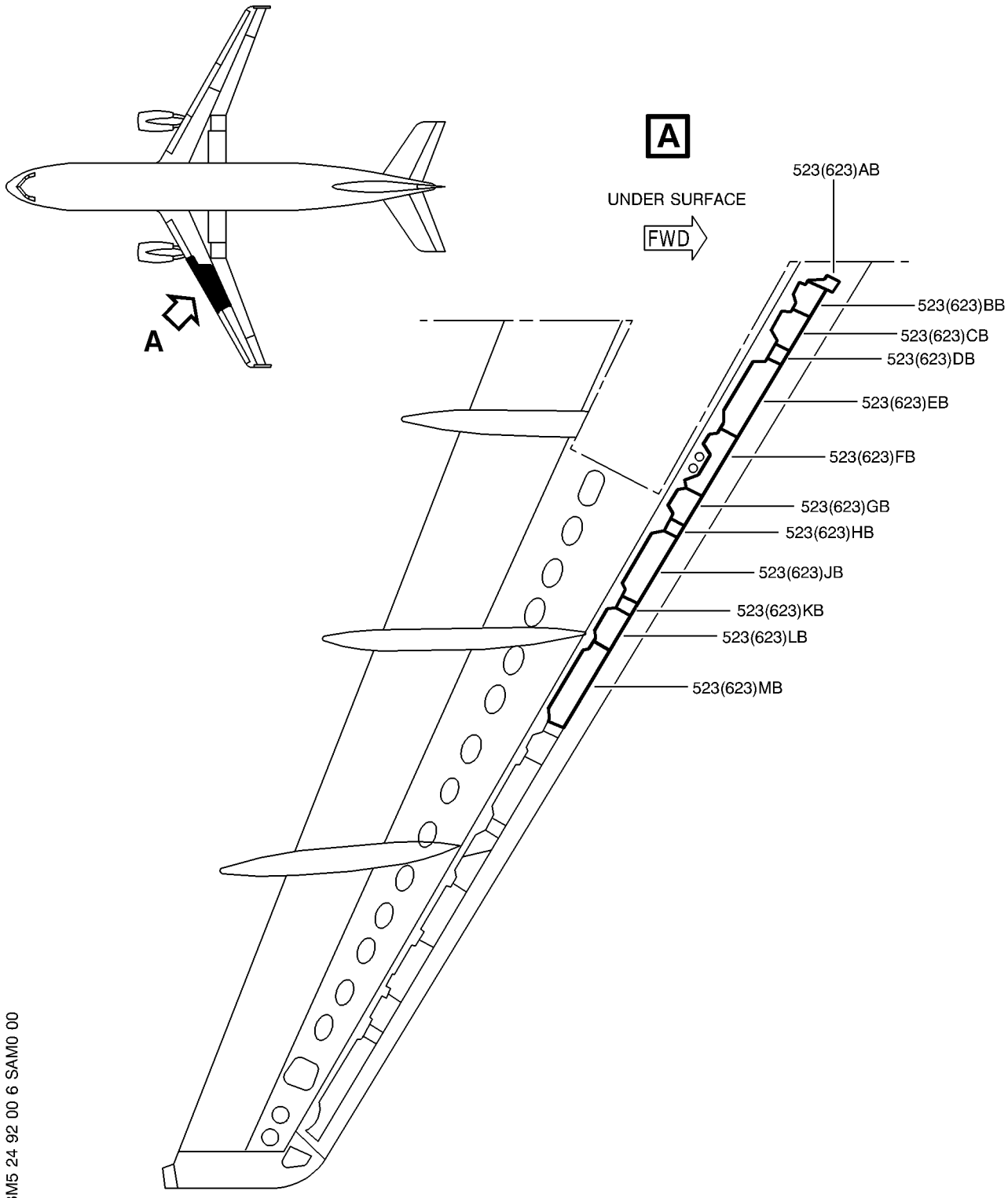
(Ref. Fig. 626)
(Ref. Fig. 627)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301).
(d)Install safety guard 98A27503003000 on flap/slat control lever.
(e)Put warning notices in position in flight compartment to prohibit slat and flap operation.
(f)Put an access platform in position below the wings.
(g)Remove leading edge access panels:
- On LH wing, remove access panels 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB and 523MB.
- On RH wing, remove access panels 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB and 623MB.

(2)General visual inspection of all wiring within slat track/screw jack area

(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
1 On AC/DC feeder routes: 1G and 2G.
2 On engine control wiring routes: 1S and 2S.
3 On miscellaneous routes: 1M and 2M.
4 On other wiring routes: 1E, 2E, 3R, 1S and 2S (Generator energization, interphone wiring and sensitive system).
NOTE : Use a flash light or a mirror if necessary.



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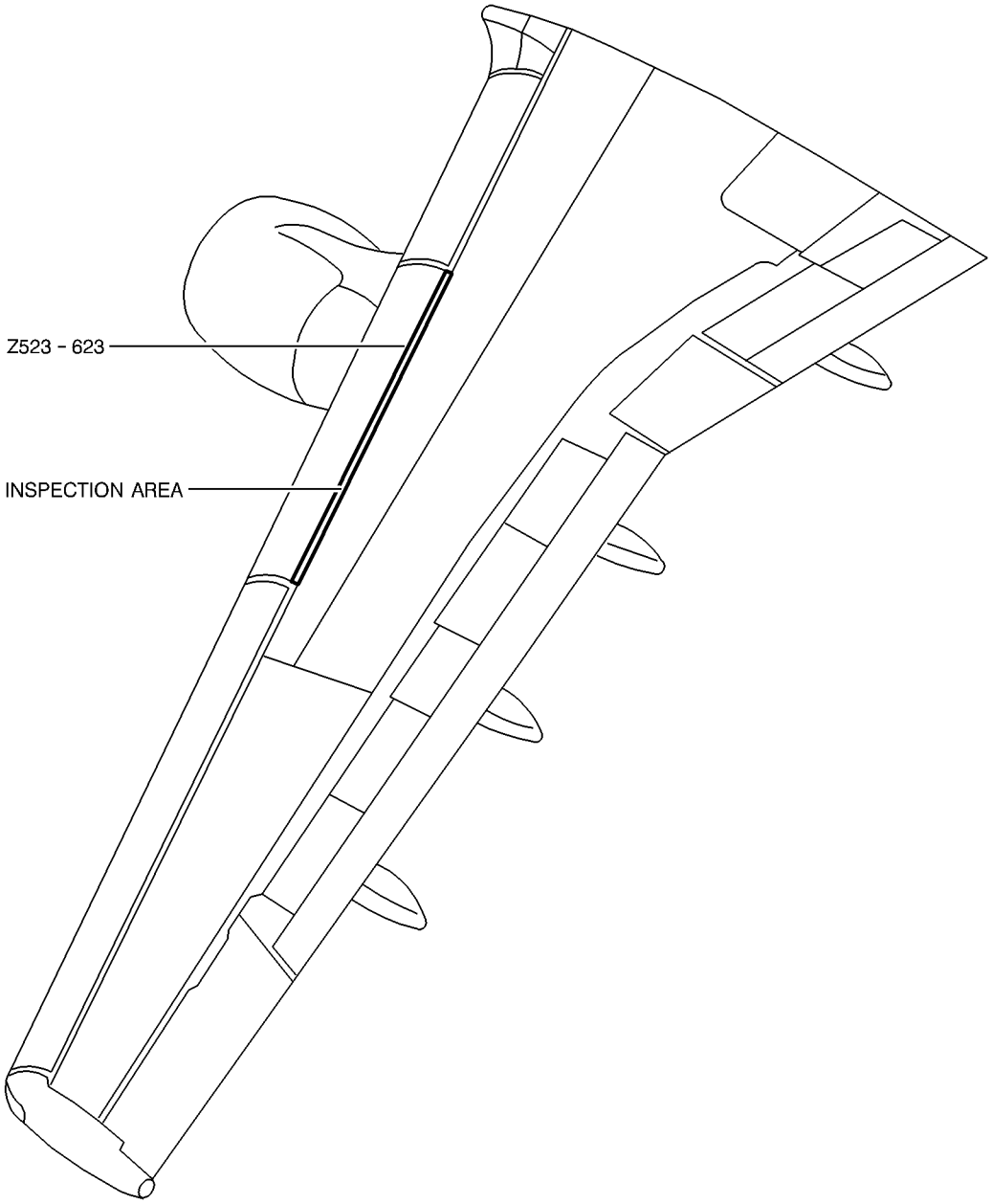
Center Fixed Leading Edge Area - Access Panels -
Zones 523-623
Figure 626



BM5 24 92 00 6 TAM0 00

Center Fixed Leading Edge Area - Inspection Area -
Zones 523-623
Figure 627

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install leading edge access panels:
- On LH wing, remove access panels 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB and 523MB.
- On RH wing, remove access panels 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB and 623MB.

(c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(d)Remove locking equipment P/N 97A27302009000 from flap/slat control lever.
(e)Remove warning notices.
(f)Fully retract slats (Ref. 27-80-00, P. Block 301).
(g)Remove access platform.

R 24. General Visual Inspection of All EWIS Within Slat Track/Screw Jack Area
R Installed in Outboard Fixed Leading Edge Area (From Rib 19 to Rib 30) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R all EWIS within slat track/screw jack area.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 3.5 m (11 ft.)
(2)98A27503003000	Flap/Slat Control Lever Safety Guard
(3)	Warning Notices
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
R - ESPM 205211	

C. Procedure

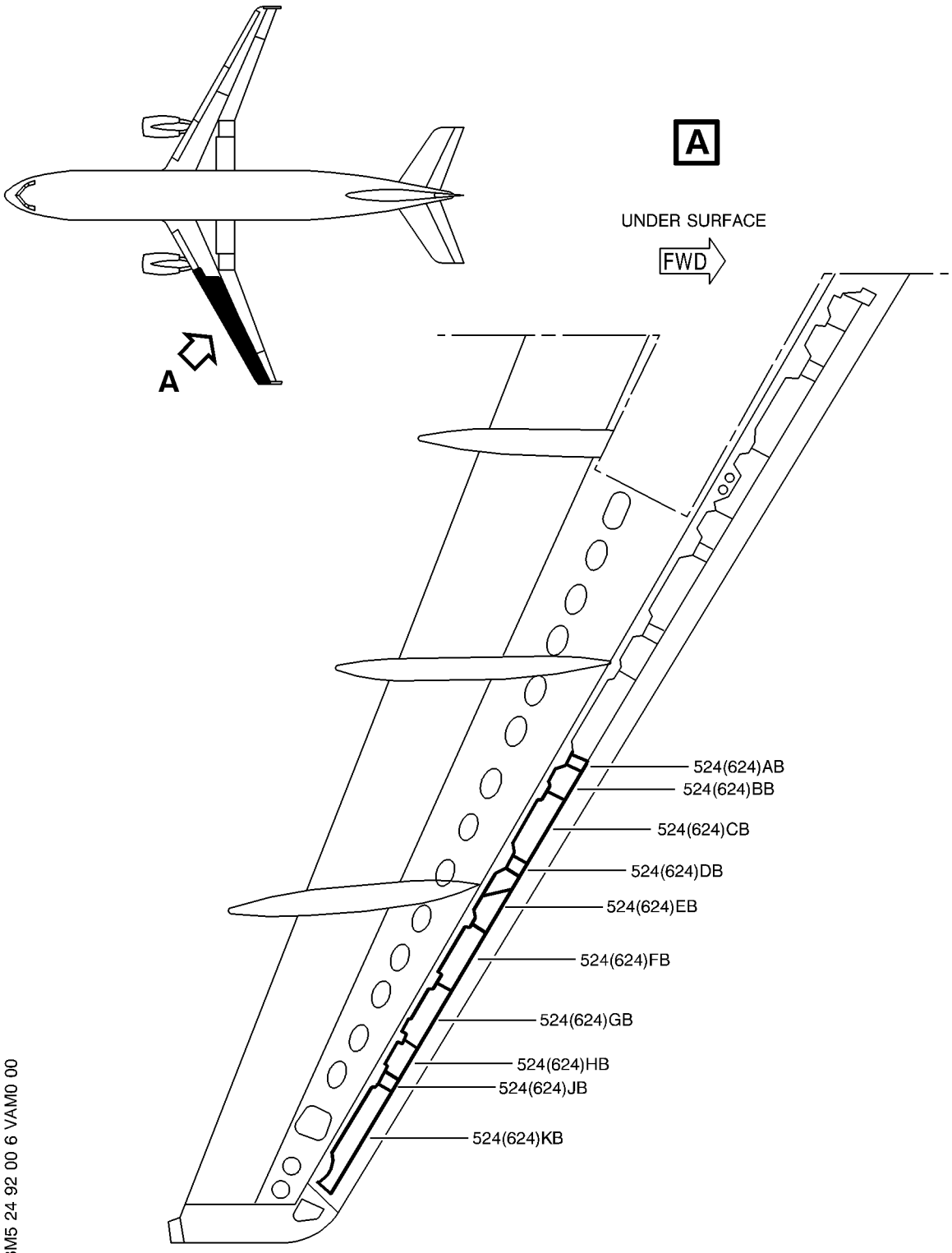
(Ref. Fig. 628)
(Ref. Fig. 629)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Fully extend slats (Ref. 27-80-00, P. Block 301).
(d)Install safety guard 98A27503003000 on flap/slat control lever.
(e)Put warning notices in position in flight compartment to prohibit slat and flap operation.
(f)Put an access platform in position below the wings.
(g)Remove leading edge access panels:
- On LH wing, remove access panels 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB and 523MB.
- On RH wing, remove access panels 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB and 623MB.

(2)General visual inspection of all wiring within slat track/screw jack area

(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
1 On AC/DC feeder routes: 1G and 2G.
2 On engine control wiring routes: 1S and 2S.
3 On miscellaneous routes: 1M and 2M.
4 On other wiring routes: 1E, 2E, 3R, 1S and 2S (Generator energization, interphone wiring and sensitive system).
NOTE : Use a flash light or a mirror if necessary.



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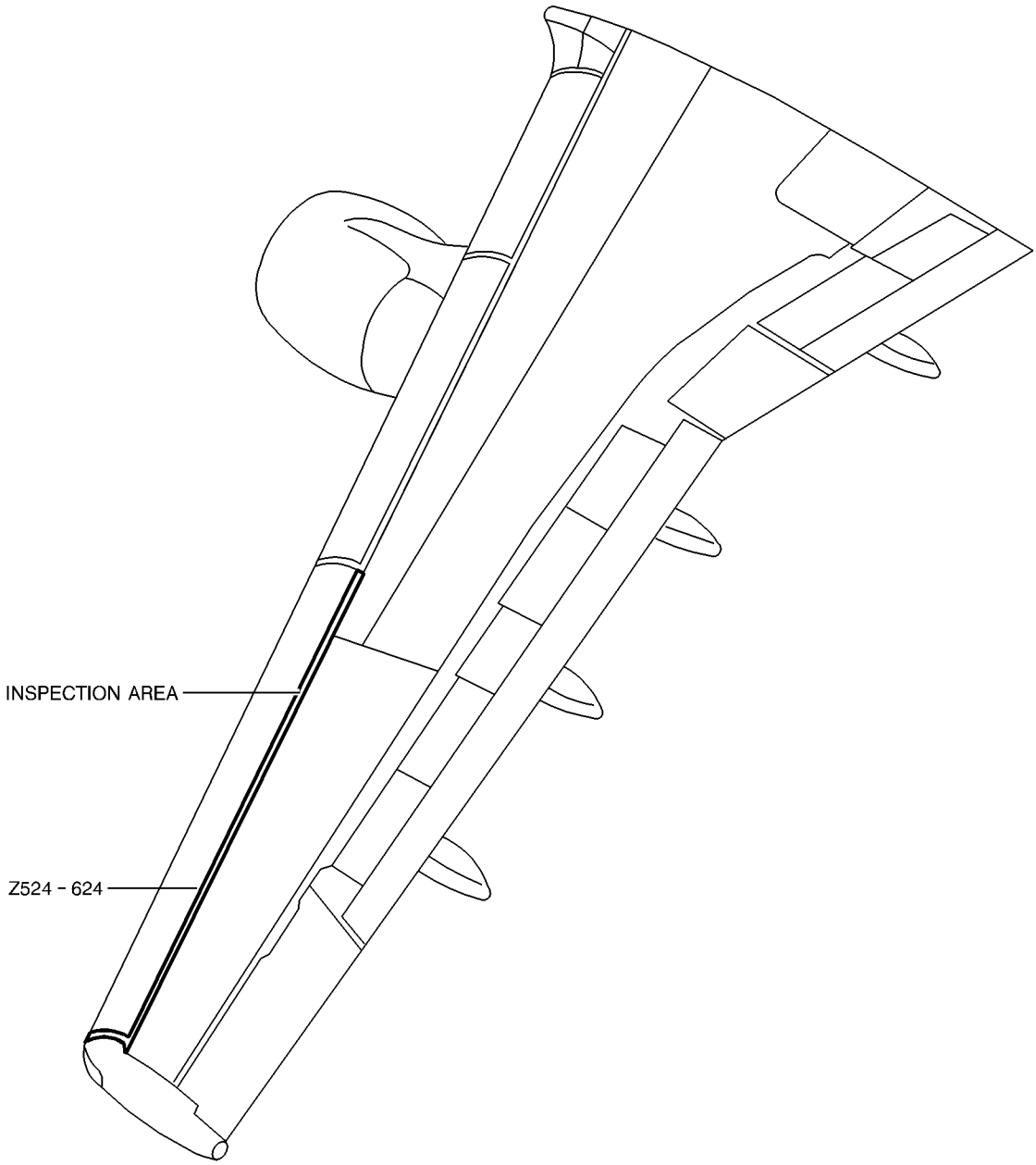
Outboard Fixed Leading Edge Area - Access Panels -
Zones 524-624
Figure 628



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Outboard Fixed Leading Edge Area - Inspection Area -
Zones 524-624
Figure 629

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install leading edge access panels:
- On LH wing, remove access panels 523AB, 523BB, 523CB, 523DB, 523EB, 523FB, 523GB, 523HB, 523JB, 523KB, 523LB and 523MB.
- On RH wing, remove access panels 623AB, 623BB, 623CB, 623DB, 623EB, 623FB, 623GB, 623HB, 623JB, 623KB, 623LB and 623MB.

(c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(d)Remove locking equipment P/N 97A27302009000 from flap/slat control lever.
(e)Remove warning notices.
(f)Fully retract slats (Ref. 27-80-00, P. Block 301).
(g)Remove access platform.

R 25. Detailed Inspection of All Exposed EWIS Installed in Inboard Fuel Tank
R (Ribs 1 to 14) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a detailed inspection of all exposed
R EWIS within the fuel tank.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 5.5 m (18 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-22, P. Block 401	Manhole Covers (Wings)
R - ESPM 205212	

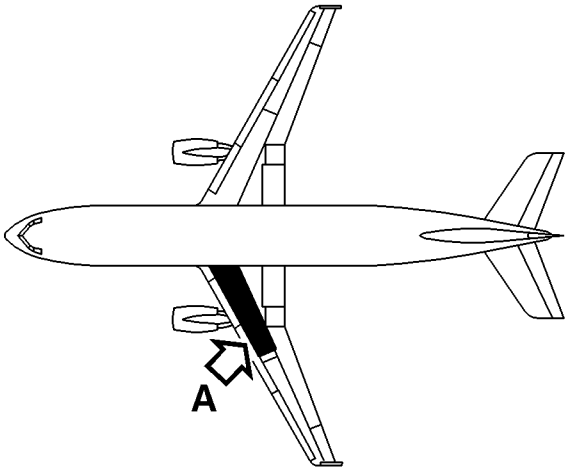
C. Procedure

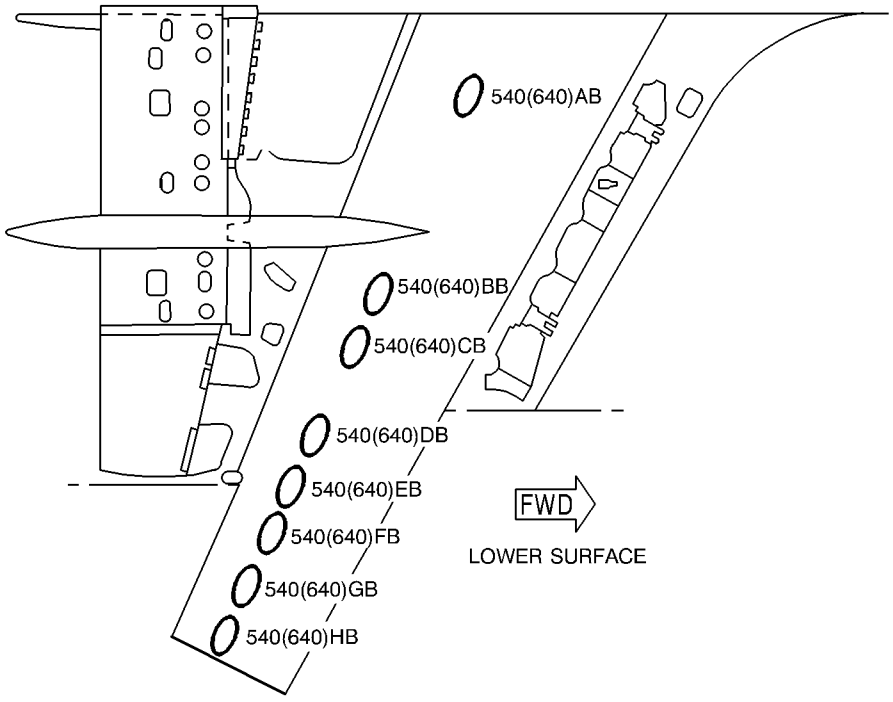
(Ref. Fig. 630)
(Ref. Fig. 631)

(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position below the wings.
(d) Remove manhole covers at zones 540 and 640 (Ref. 28-11-22, P. Block 401):
- On LH wing, remove manhole covers 540AB, 540BB, 540CB, 540DB, 540EB, 540FB, 540GB and 540HB.
- On RH wing, remove manhole covers 640AB, 640BB, 640CB, 640DB, 640EB, 640FB, 640GB and 640HB.

(2) Detailed inspection of all exposed wiring installed in inboard fuel tank
(a) Do a detailed inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205212).
1 On sensitive system routes: 1S and 2S.
NOTE : Use a flash light or a mirror if necessary.

(3) Close-up
(a) Make certain that the work area is clean and clear of tools and other items.
(b) Install manhole covers at zones 540 and 640 (Ref. 28-11-22, P. Block 401):
- On LH wing, install manhole covers 540AB, 540BB, 540CB, 540DB, 540EB, 540FB, 540GB and 540HB.
- On RH wing, install manhole covers 640AB, 640BB, 640CB, 640DB, 640EB, 640FB, 640GB and 640HB.





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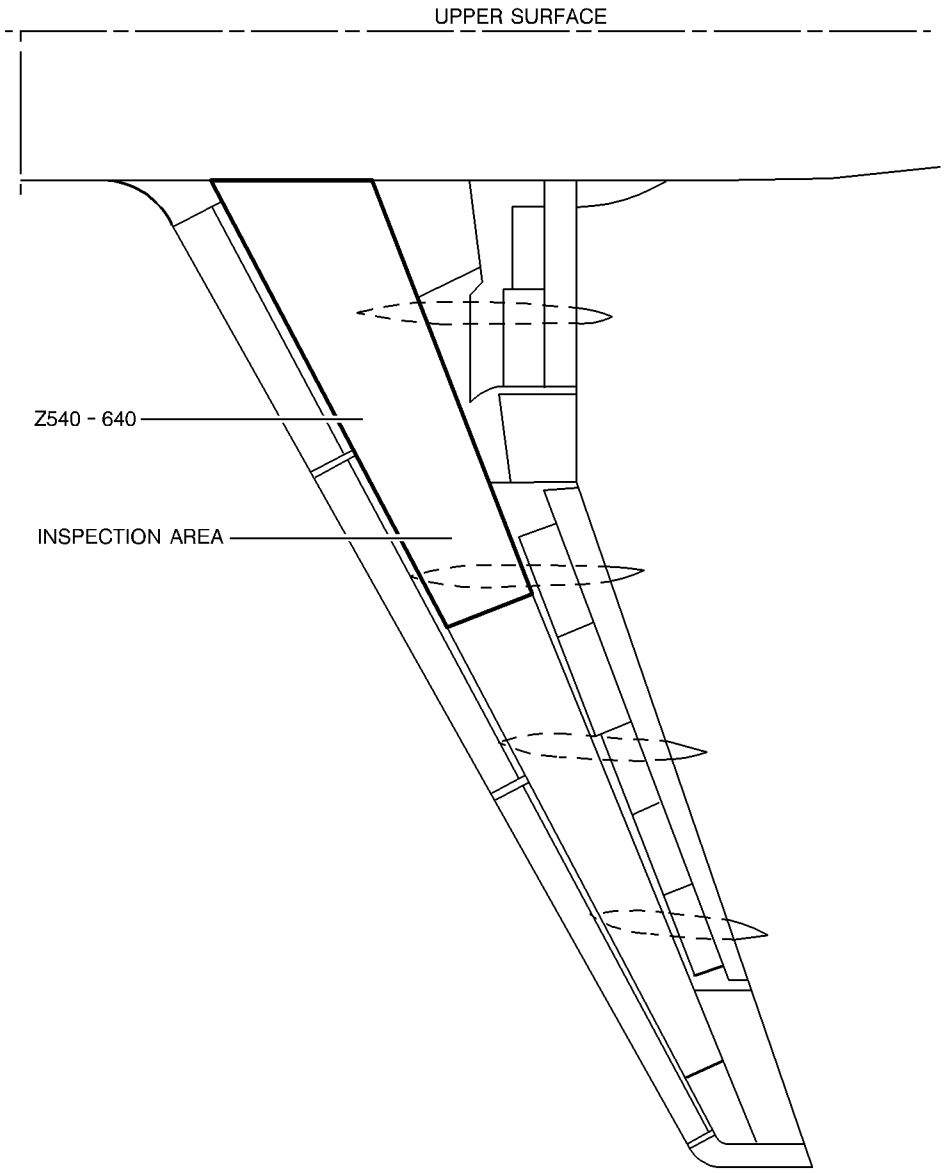
Inboard Fuel Tank - Access Panels - Zones 540-640
Figure 630



BM5 24 92 00 6 YAM0 00

Inboard Fuel Tank - Inspection Area -
Zones 540-640
Figure 631

(c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(d)Remove access platform.

R 26. Detailed Inspection of All Exposed EWIS Installed in Outboard Fuel Tank
R (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a detailed inspection of all exposed
R EWIS within the fuel tank.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 5.5 m (18 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 28-11-22, P. Block 401	Manhole Covers (Wings)
R - ESPM 205212	

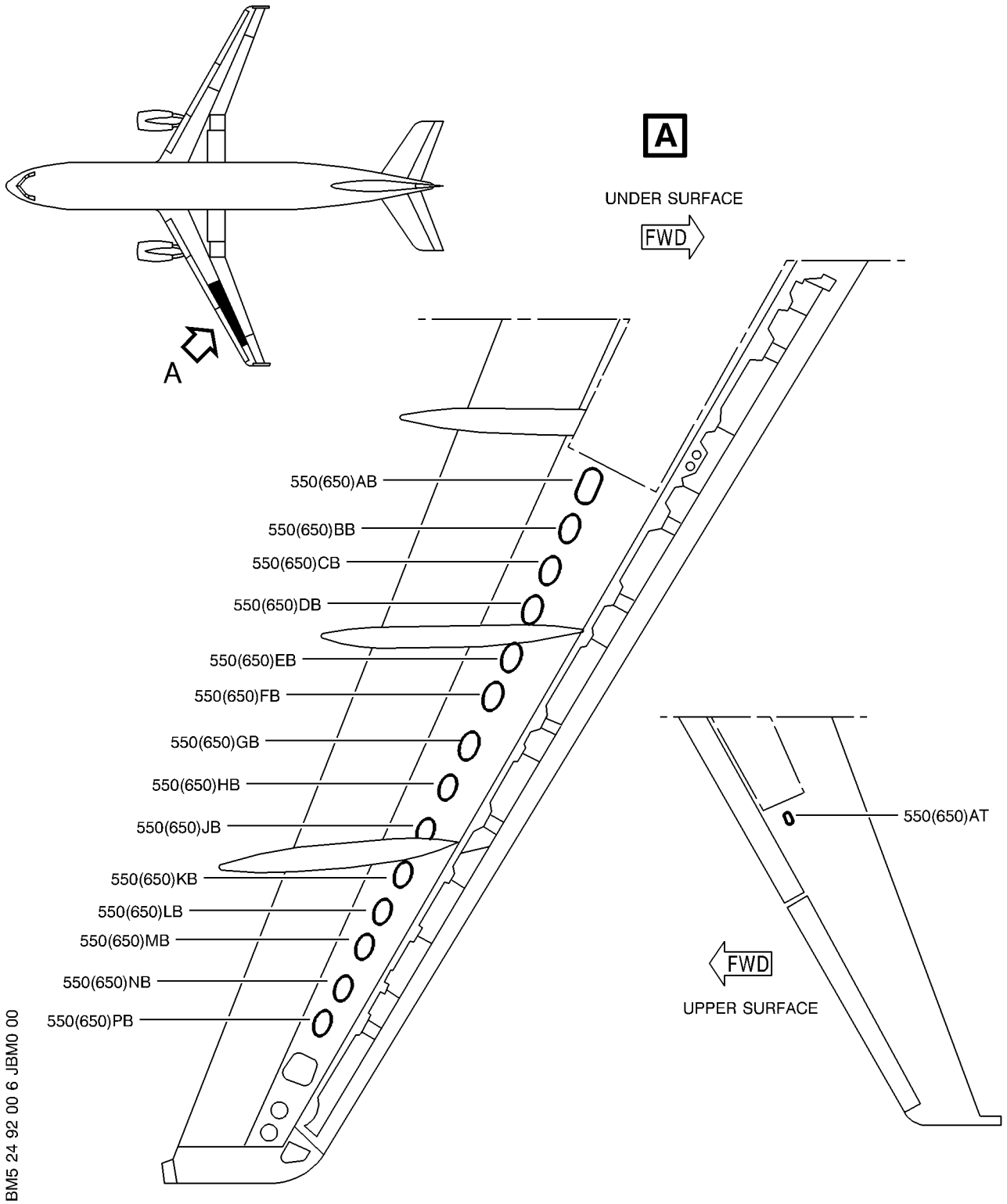
C. Procedure

(Ref. Fig. 632)
(Ref. Fig. 633)

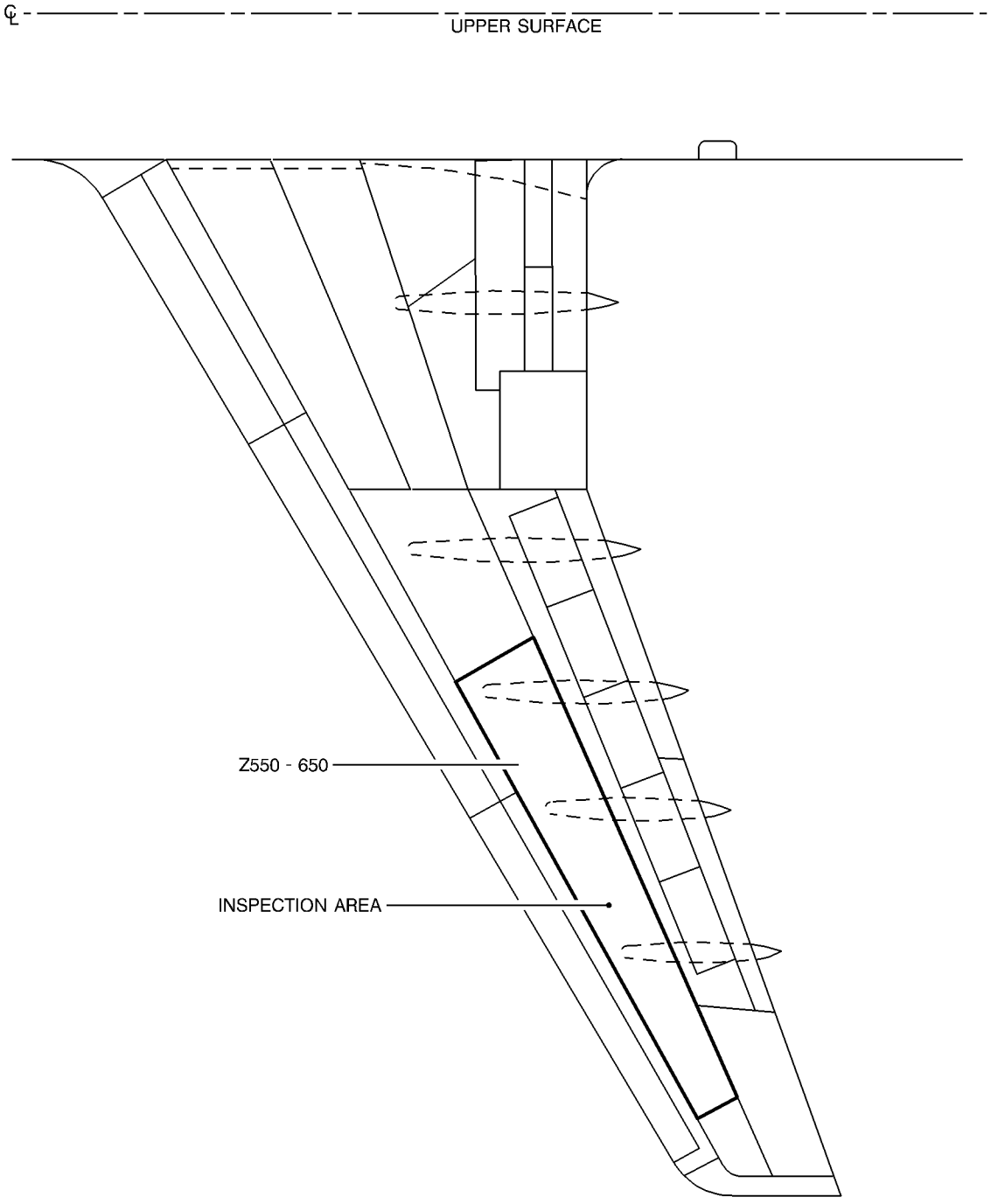
(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position below the wings.
(d) Remove manhole covers at zones 550 and 650 (Ref. 28-11-22, P. Block 401):
- On LH wing, remove manhole covers 550AB, 550BB, 550CB, 550DB, 550EB, 550FB, 550GB, 550HB, 550JB, 550KB, 550LB, 550MB, 550NB, 550PB and 550AT.
- On RH wing, remove manhole covers 650AB, 650BB, 650CB, 650DB, 650EB, 650FB, 650GB, 650HB, 650JB, 650KB, 650LB, 650MB, 650NB, 650PB and 650AT.

(2) Detailed inspection of all exposed wiring installed in outboard fuel tank
(a) Do a detailed inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205212).
1 On sensitive system routes: 1S and 2S.
NOTE : Use a flash light or a mirror if necessary.

(3) Close-up
(a) Make certain that the work area is clean and clear of tools and other items.
(b) Install manhole covers at zones 550 and 650 (Ref. 28-11-22, P. Block 401):
- On LH wing, install manhole covers 550AB, 550BB, 550CB, 550DB, 550EB,



Outboard Fuel Tank - Access Panels - Zones 550-650
Figure 632



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Outboard Fuel Tank - Inspection Area - Zones 550-650
Figure 633

550FB, 550GB, 550HB, 550JB, 550KB, 550LB, 550MB, 550NB, 550PB and 550AT.

- On RH wing, install manhole covers 650AB, 650BB, 650CB, 650DB, 650EB, 650FB, 650GB, 650HB, 650JB, 650KB, 650LB, 650MB, 650NB, 650PB and 650AT.

(c)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d)Remove access platform.

R 27. General Visual Inspection of All EWIS Within Fairings on Main
R Gear Well (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS within the fairing.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4 m (13 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
R - ESPM 205211	

C. Procedure

(Ref. Fig. 634)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position below the wings.

(d) Remove fuel pump fairings at zones 571 and 671.

(2) Visual inspection of all wiring installed within fairings

(a) Do a detailed inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

1 On AC/DC power-distribution routes: P routes.

NOTE : Use a flash light or a mirror if necessary.

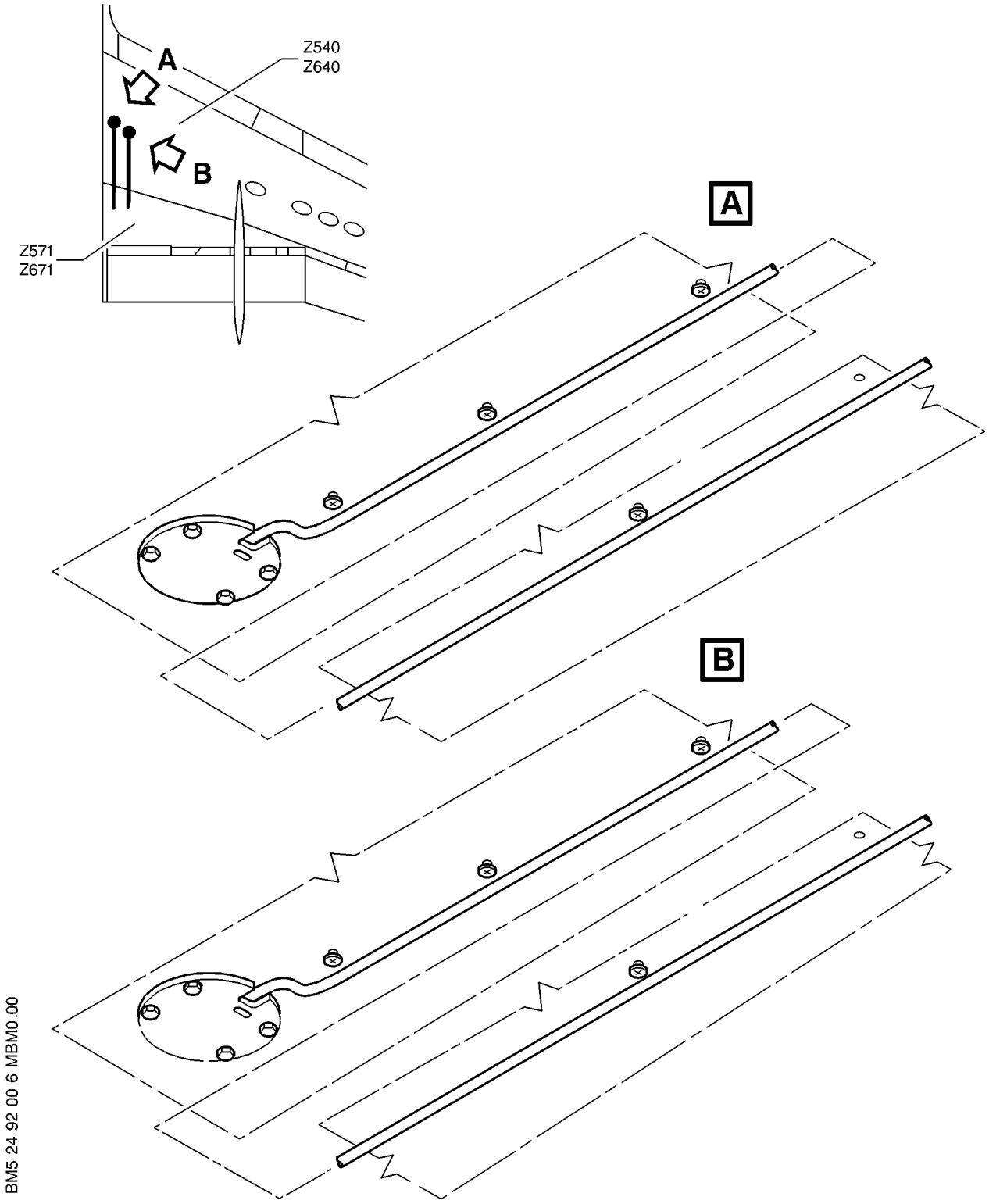
(3) Close-up

(a) Make certain that the work area is clean and clear of tools and other items.

(b) Install fuel pump fairings at zones 571 and 671.

(c) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d) Remove access platform.



Main Gear Well - Inspection Area - Zones 571-671
Figure 634

R 28. General Visual Inspection of EWIS Installed Within Flap Track 2-Gearbox
R Area (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of
R EWIS within flap track 2-gearbox area.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27503003000	Flap/Slat Control Lever Safety Guard
(2)	Access Platform 4 m (13 ft.)
(3)	Warning Notices
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 27-50-00, P. Block 301	Flaps
- 27-60-00, P. Block 301	Spoilers and Speed Brakes
R - ESPM 205211	

C. Procedure

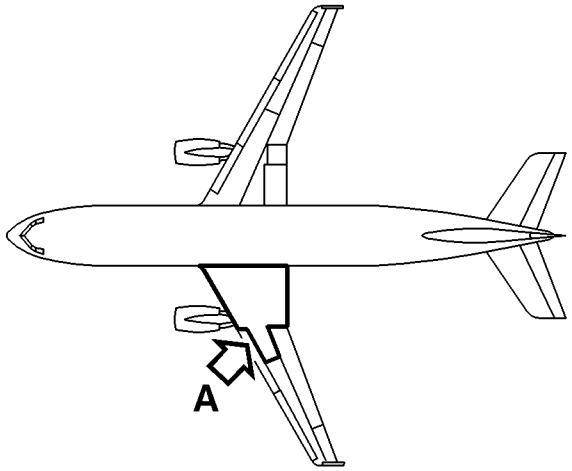
(Ref. Fig. 635)
(Ref. Fig. 636)

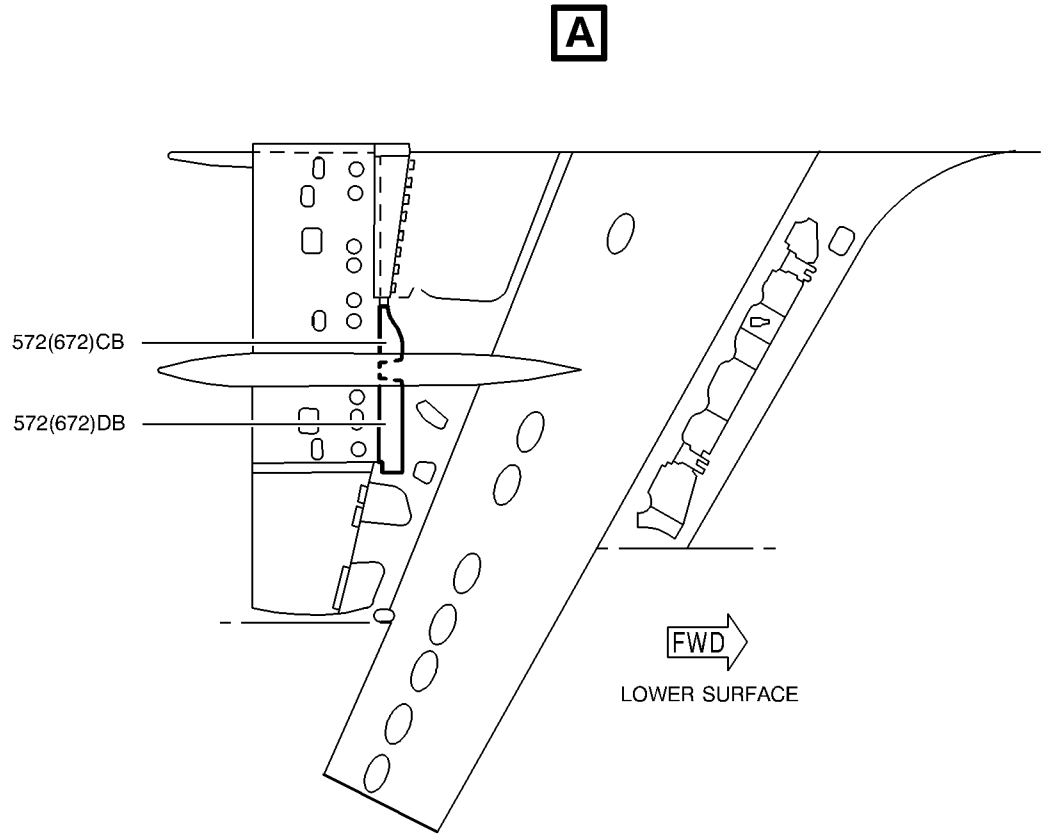
(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Fully extend flaps (Ref. 27-50-00, P. Block 301).
(d)Extend spoilers 1 and 2 (Ref. 27-60-00, P. Block 301).
(e)Install safety guard 98A27503003000 on flap/slat control lever.
(f)Put warning notices in position in flight compartment to prohibit slat, flap and spoiler operation.
(g)Put an access platform in position below the wings.
(h)Remove trailing edge access panels:
- On LH wing, remove access panels 572CB and 572DB.
- On RH wing, remove access panels 672CB and 672DB.

(2)Visual inspection of wiring installed within flap track 2-gearbox area

(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
1 On AC/DC power-distribution routes: 1P and 2P.
2 On miscellaneous routes: 1M and 2M.
3 On interphone wiring route: 3R.
4 On sensitive system wiring routes: 1S and 2S.
5 On flux valve circuit wiring routes: 1V and 2V.
NOTE : Use a flash light or a mirror if necessary.





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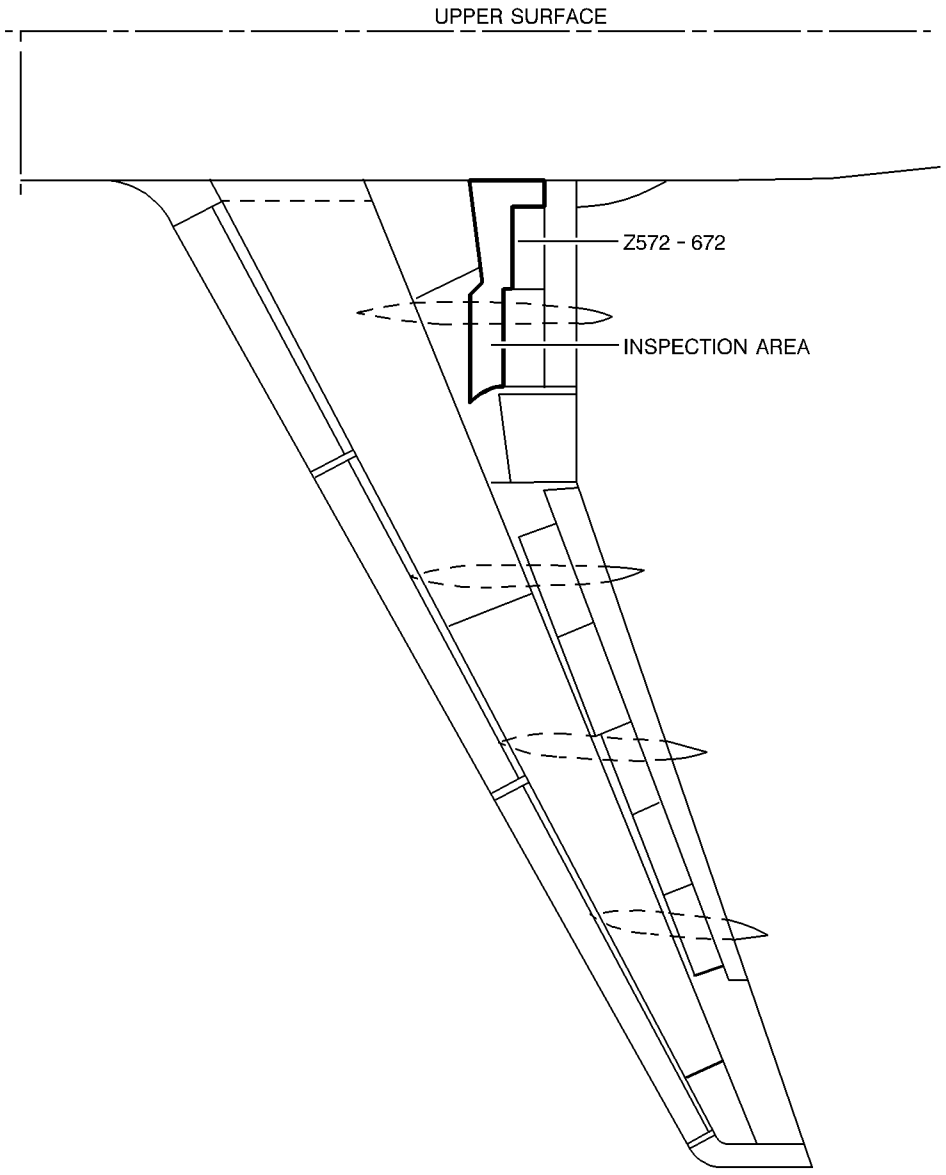
Trailing Edge Area (Shroud Box)- Access Panels -
Zones 572-672
Figure 635



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Trailing Edge Area (Shroud Box)- Inspection Area -
Zones 572-672
Figure 636

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install trailing edge access panels:
- On LH wing, install access panels 572CB and 572DB.
- On RH wing, install access panels 672CB and 672DB.
(c)Remove safety guard 98A27503003000 from flap/slat control lever.
(d)Retract flaps (Ref. 27-50-00, P. Block 301).
(e)Retract spoilers 1 and 2 (Ref. 27-60-00, P. Block 301).
(f)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(g)Remove warning notices.
(h)Remove access platform.

R 29. General Visual Inspection of EWIS Installed Within Fairing in Fixed
R Trailing Edge Area (From Ribs 11 to 25) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS within the fairing.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4 m (13 ft.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
R - ESPM 205211	

C. Procedure

(Ref. Fig. 637)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position below the wings.

(d) Remove fuel pump fairings at zones 581 and 681.

(2) Visual inspection of wiring installed within flap track 2-gearbox area

(a) Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).

1 On AC/DC power-distribution routes: P routes.

NOTE : Use a flash light or a mirror if necessary.

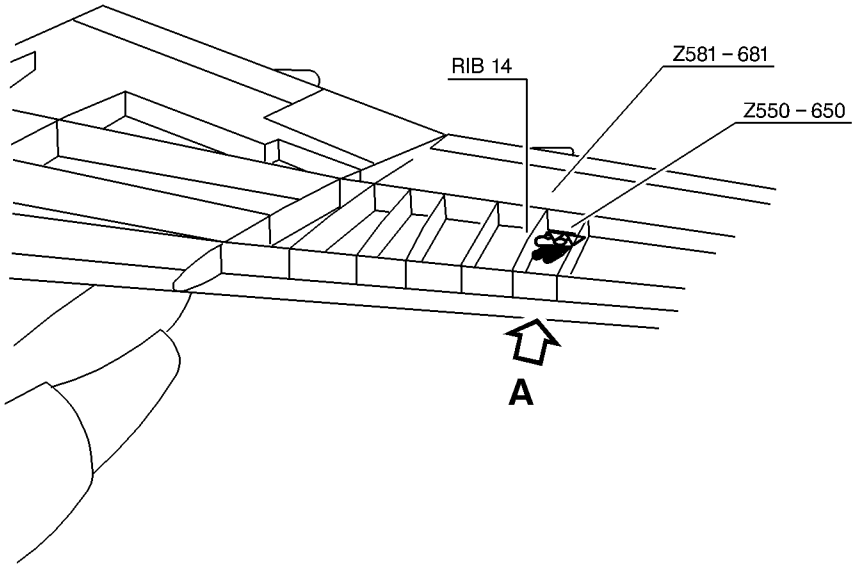
(3) Close-up

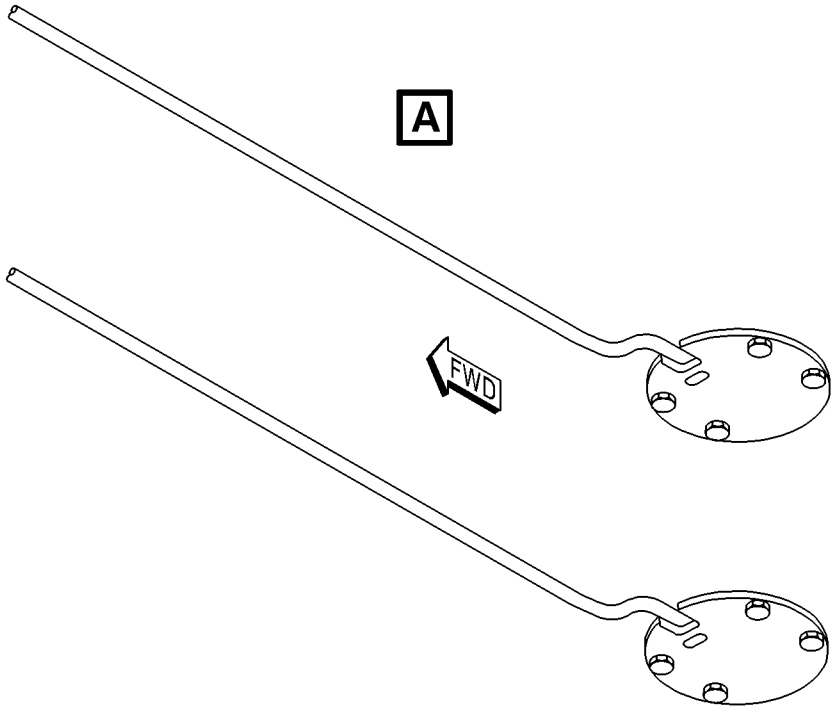
(a) Make certain that the work area is clean and clear of tools and other items.

(b) Install fuel pump fairings at zones 581 and 681.

(c) Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(d) Remove access platform.





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Fixed Trailing Edge Area - Inspection Area - Zones 581-681
Figure 637

R 30. General Visual Inspection of All EWIS Installed Within Fixed Trailing
R Edge Area (From Ribs 25 to 31) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS within the zone.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)98A27503003000	Flap/Slat Control Lever Safety Guard
(2)	Access Platform 4 m (13 ft.)
(3)	Warning Notices
(4)	Flash Light
(5)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
R - ESPM 205211	

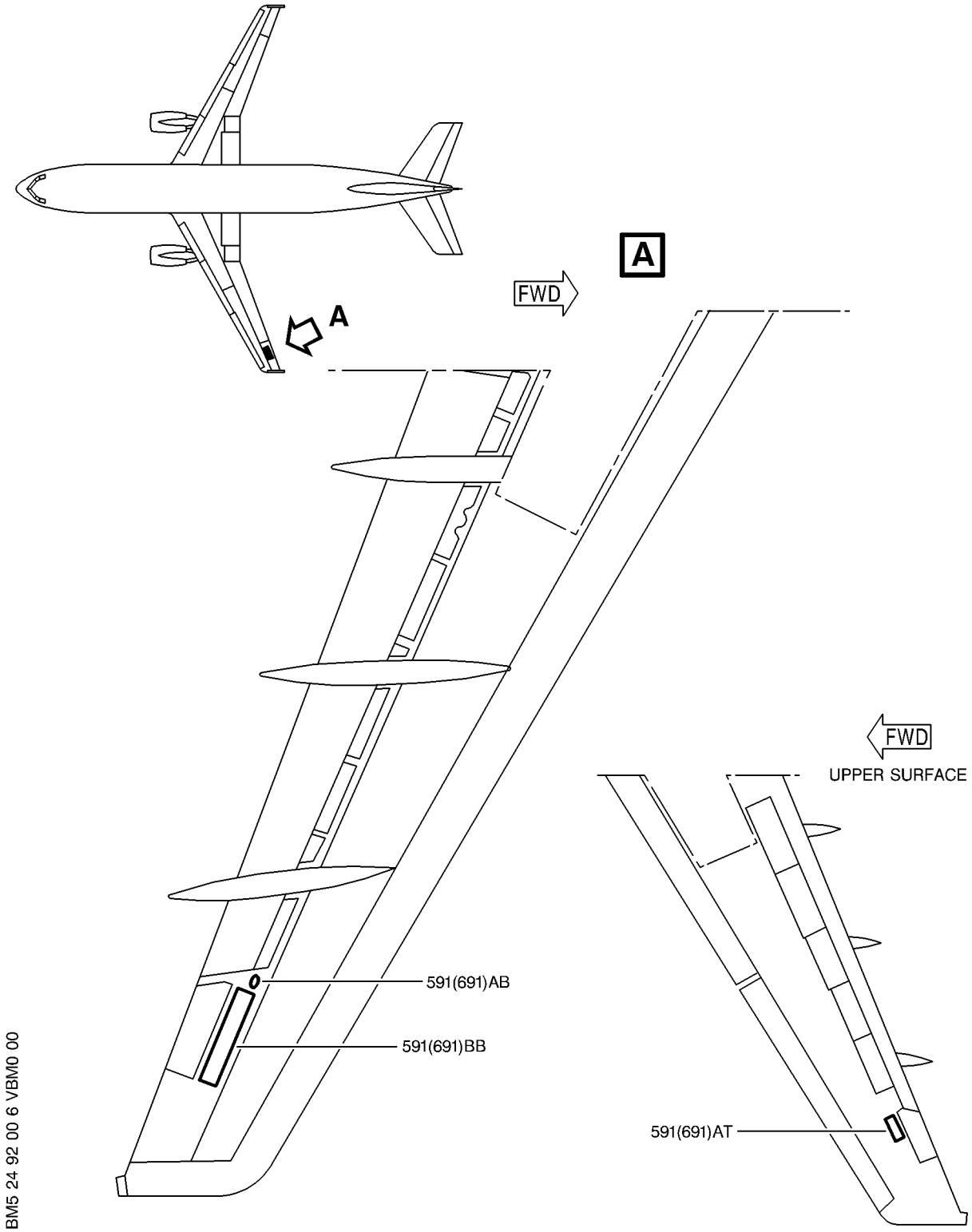
C. Procedure

(Ref. Fig. 638)
(Ref. Fig. 639)

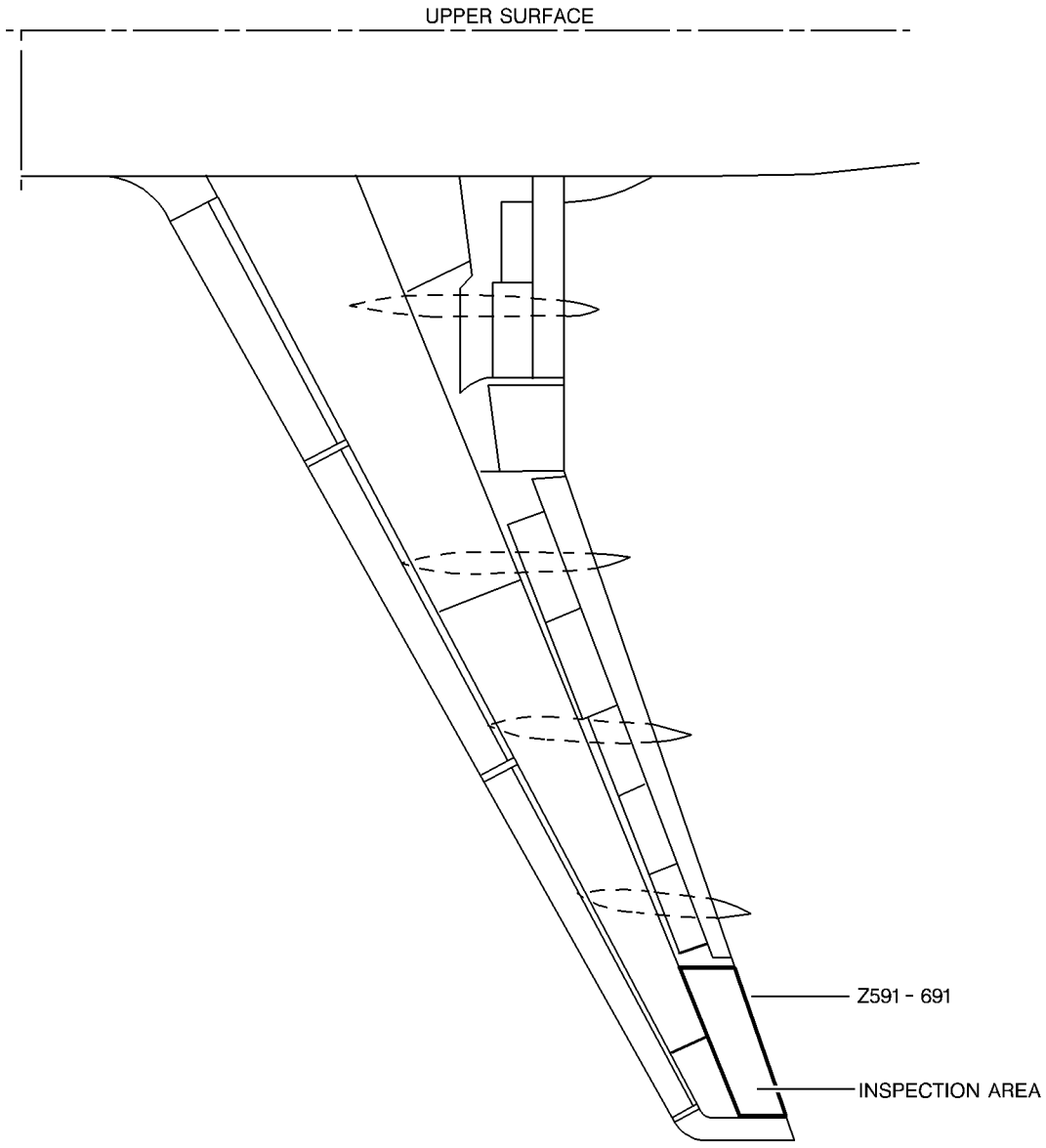
(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Install safety guard 98A27503003000 on flap/slat control lever.
(d)Put warning notices in position in flight compartment to prohibit slat and flap operation.
(e)Put an access platform in position below the wings.
(f)Remove the access panels:
- For LH wing, remove access panels 591AB, 591BB and 591AT.
- For RH wing, remove access panels 691AB, 691BB and 691AT.

(2)Visual inspection of all wiring within the zone
(a)Do a visual inspection of the wiring to make sure that there are no signs of ageing, alteration, overheating, scaling and deformation
R (Ref. ESPM 205211).
1 On miscellaneous routes: 1M and 2M.
2 On interphone wiring route: 3R.
3 On sensitive system routes: 1S and 2S.
4 On flux valve circuit routes: 1V and 2V.
NOTE : Use a flash light or a mirror if necessary.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install access panels:
- For LH wing, install access panels 591AB, 591BB and 591AT.



Fixed Trailing Edge Area - Access Panels - Zones 591-691
Figure 638



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Fixed Trailing Edge Area - Inspection Area - Zones 591-691
Figure 639

- For RH wing, install access panels 691AB, 691BB and 691AT.

(c)Remove safety guard 98A27503003000 from flap/slat control lever.

(d)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(e)Remove warning notices.

(f)Remove access platform.

R 31. General Visual Inspection of All EWIS Within Bay Aft of FWD Cargo
R Compartment (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a general visual inspection of all
R EWIS in the bay aft of FWD cargo compartment.
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
(2)	Flash Light
(3)	Mirror
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-55, P. Block 401	FWD Cargo Compartment Fixed Partition
R - ESPM 205211	

C. Procedure

(Ref. Fig. 606)

(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position at FWD cargo compartment door 811.
(d) Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e) Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f) Remove FWD cargo-compartment partition at FR38.2 (Ref. 53-10-55, P. Block 401).

(2) General visual inspection of wiring in the bay aft of FWD cargo compartment
(a) Do a visual inspection of the wiring to make sure that there are no signs of damage, corrosion, leaks, cracks, chafing or combustible
R accumulation on wiring (Ref. ESPM 205211).
1 On AC/DC feeder routes: power feeders 1 and 2 G, E, P routes.
2 In AC/DC power distribution routes: trim air valves, pressure regulation valves, pressure relief valves.
3 On flight control wiring routes: wing equipment.
NOTE : Use a flashlight or a mirror if necessary.

(3) Close-up
(a) Make certain that the work area is clean and clear of tools and other items.
(b) Install FWD cargo-compartment partition at FR38.2 (Ref. 53-10-55,

P. Block 401).
(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 1. Cleaning of EWIS Installed in Avionics Compartment (Only
R Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of EWIS installed
R in the avionics compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-27, P. Block 401	Avionics Compartment Floor Panels
- 53-10-53, P. Block 401	Avionics Compartment - Fixed Partition
- ESPM 205500	

C. Procedure

(Ref. Fig. 701)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at FWD cargo compartment door 811.

(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(f)Remove partition walls at FR20 (Ref. 53-10-53, P. Block 401).

(g)Remove floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(2)Cleaning of wiring installed in avionics compartment (only contaminated wiring)

(a)Clean wiring if there is dust, lint or hydraulic contamination
R (Ref. ESPM 205500).

1 On AC/DC feeder routes: 1G, 2G, 3G, 4G, 1E, 2E and 3E.

2 On AC/DC power distribution routes: 1P, 2P, 3P, 4P and 5P.

3 On flight control wiring route.

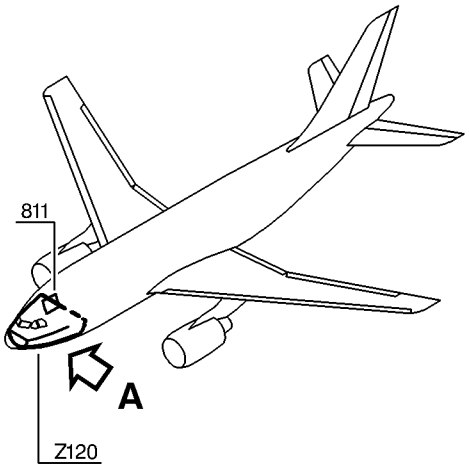
4 On engine control wiring routes: 1S, 2S and 3S.

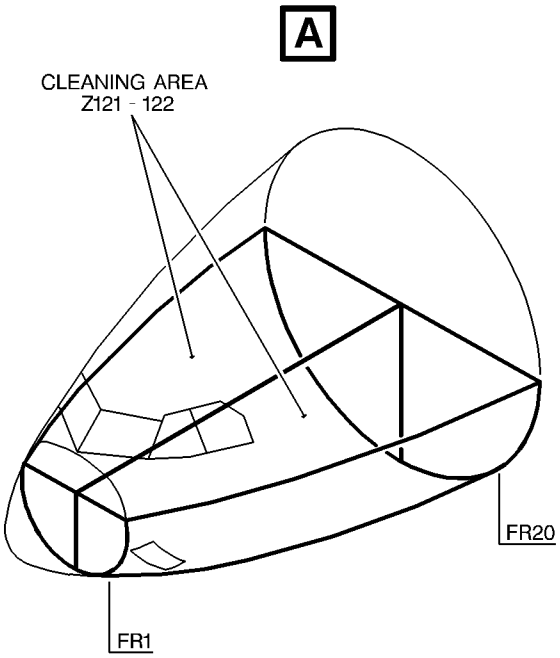
5 On miscellaneous routes: 1M, 2M and 3M.

6 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.

7 On radio communication and navigation control wiring routes: 1C and 2C.

8 On radio communication and radio navigation, interphone, automatic





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Avionics Compartment - Cleaning Area - Zones 121-122
Figure 701

direction finder wiring routes: 1R, 2R, 3R, 4R and 5R.

9 On VHF1, VHF2, ATC1 and ATC2, DME1 and DME2, HF1, HF2, VHF3 wiring routes: 1T, 2T, 3T, 4T, 7T, 8T and 9T.

10 On VOR1, VOR2, glide, localiser, marker wiring routes: 1U, 2U, 3U, 4U and 5U.

11 On VHF (flux valve) wiring routes: 1V, 2V and 7V.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install floor panels between FR1 and FR20 (Ref. 53-10-27, P. Block 401).

(c)Install partition walls at FR20 (Ref. 53-10-53, P. Block 401).

(d)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).

(e)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).

(f)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(g)Remove access platform.

R 2. Cleaning of All Power Feeder EWIS Installed in FWD Cargo Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a cleaning of all power feeder
R EWIS installed (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-54-10, P. Block 201	FWD Cargo Compartment Linings
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- ESPM 205500	

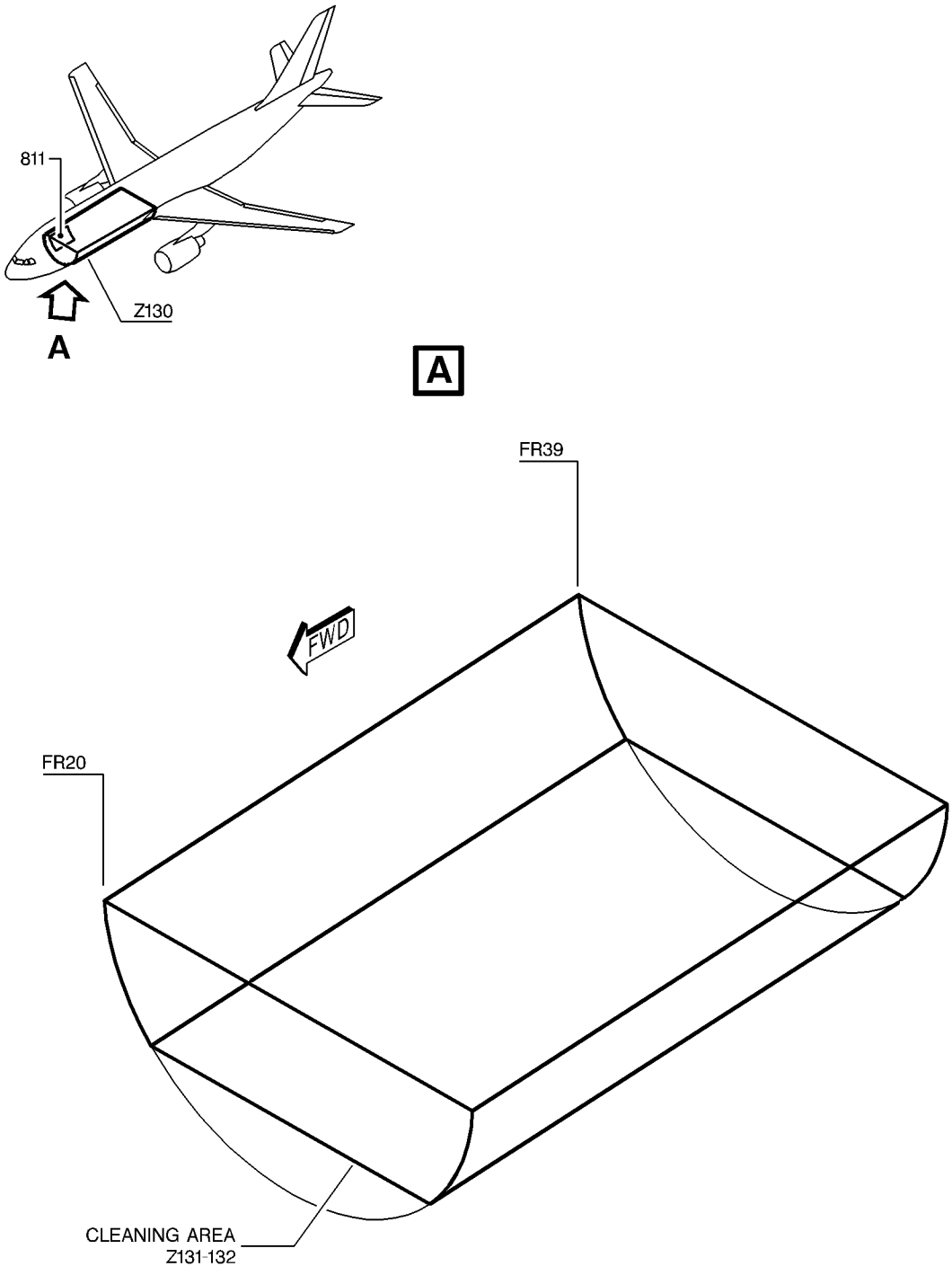
C. Procedure

(Ref. Fig. 702)

(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at FWD cargo compartment door 811.
(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove sidewall and ceiling panels between FR20 and FR39 (Ref. 25-54-10, P. Block 201).

(2)Cleaning of all power feeder wiring installed (only contaminated wiring)
(a)Clean wiring if there is dust, lint, oil or hydraulic contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: G routes to engines 1 and 2.
2 On AC/DC power distribution routes: P, E routes, CLS PDU supply wiring feeder, ventilation valve.
3 On flight control wiring route: auto pilot routes.
4 On miscellaneous routes: route M.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install sidewall and ceiling panels between FR20 and FR39 (Ref. 25-54-10, P. Block 201).
(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00,



FWD Cargo Compartment - Cleaning Area - Zones 131-132
Figure 702

P. Block 301).
(f)Remove access platform.

R 3. Cleaning of All PDU Supply EWIS Installed in Bay Under FWD Cargo
R Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all PDU supply EWIS
R (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

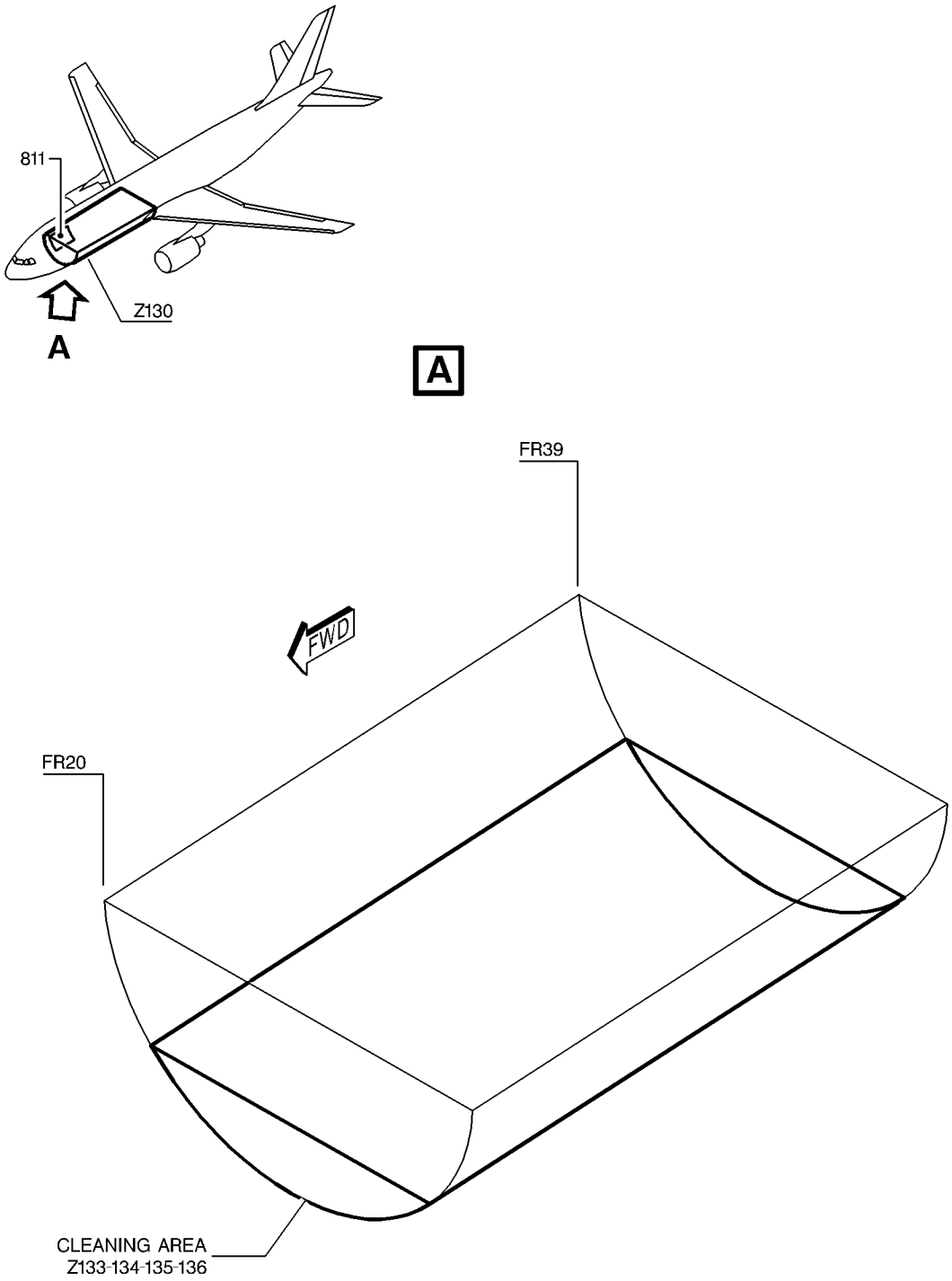
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-29, P. Block 401	FWD Cargo Compartment Floor Panels
- ESPM 205500	

C. Procedure

(Ref. Fig. 703)

(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at FWD cargo compartment door 811.
(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove FWD cargo compartment floor panels between FR20 and FR39 (Ref. 53-10-29, P. Block 401).
(2)Cleaning of all PDU supply wiring (only contaminated wiring)
(a)Clean wiring if there is dust, lint or hydraulic contamination
R (Ref. ESPM 205500).
1 On AC/DC feeder routes: PDU supply, valve actuators for air distribution.
2 On AC/DC power distribution routes: DME 1 and 2, ATC 1 and 2, marker antenna wiring.
(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install FWD cargo compartment floor panels between FR20 and FR39 (Ref. 53-10-29, P. Block 401).
(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).



FWD Cargo Compartment - Cleaning Area -
Zones 133-134-135-136
Figure 703

(f)Remove access platform.

R 4. Cleaning of All EWIS in Area Around PDU Feeder Pressure Seals Installed
R in Bay Aft of FWD Cargo Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS in the area
R around of the PDU feeder pressure seals (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-55, P. Block 401	FWD Cargo Compartment Fixed Partition
- ESPM 205500	

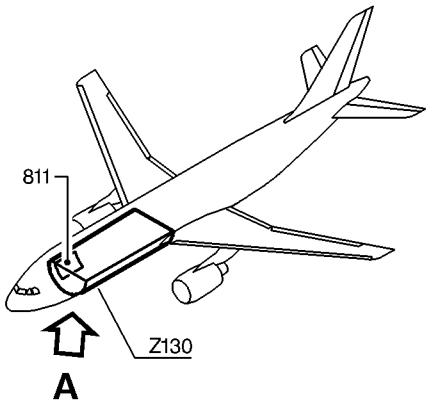
C. Procedure

(Ref. Fig. 704)

(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at FWD cargo compartment door 811.
(d)Open FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove FWD cargo-compartment partition at FR38.2 (Ref. 53-10-55, P. Block 401).

(2)Cleaning of all wiring in the area around of the PDU feeder pressure seals (only contaminated wiring)
(a)Clean wiring if there is dust, lint or hydraulic contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: power feeders 1 and 2 G, E, P routes.
2 On AC/DC power distribution routes: trim air valves, pressure regulation valves, pressure relief valves.
3 On flight control wiring routes: wing equipment.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install FWD cargo compartment partition at FR38.2 (Ref. 53-10-55, P. Block 401).
(c)Remove door actuator safety lock from FWD cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close FWD cargo compartment door 811 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00,



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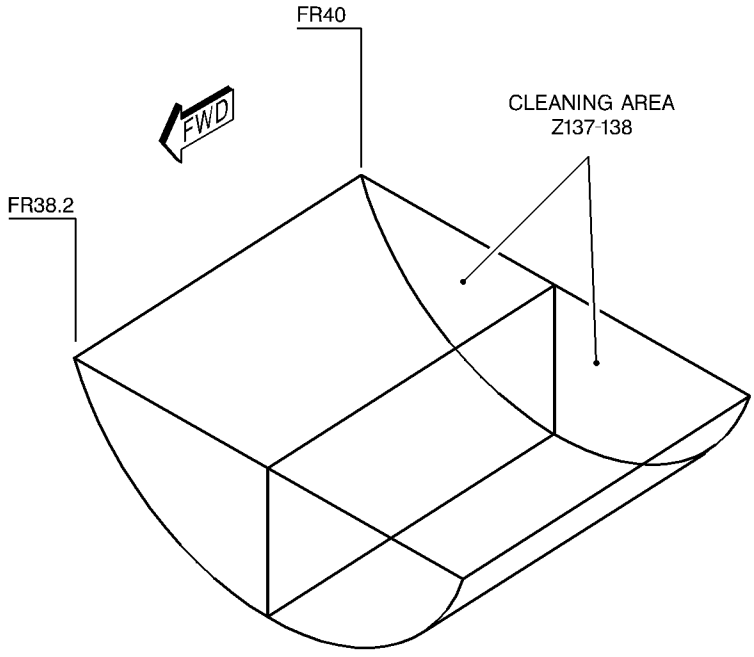

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Bay Aft of FWD Cargo Compartment - Cleaning Area -
Zones 137-138
Figure 704

P. Block 301).
(f)Remove access platform.

R 5. Cleaning of EWIS Installed in the Pressurized Zone Between Wing Center Box
R Main Gear Well and Cabin Floor (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of EWIS installed in the pressurized zone between wing center box main gear well and cabin floor
R (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-21-00, P. Block 401	Passenger Compartment Seats
- 25-21-61, P. Block 401	Cabin Attendant Seats Free Standing
- 25-27-00, P. Block 1	Ancillary Equipment
- 25-32-11, P. Block 401	Center Galley Unit
- 25-32-12, P. Block 401	Center Galley Unit
- 25-32-13, P. Block 401	Center Galley Unit
- 25-32-14, P. Block 401	Center Galley Unit
- 25-42-11, P. Block 401	Lavatories O + P
- 25-42-61, P. Block 401	Lavatory W
- 25-42-71, P. Block 401	Lavatory T
- 25-42-81, P. Block 401	Lavatory L+M Variable
- 52-10-00, P. Block 1	Passenger/Crew Doors
- 53-10-25, P. Block 401	Passenger Compartment Floor Panels
- ESPM 205500	

C. Procedure

(Ref. Fig. 705)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

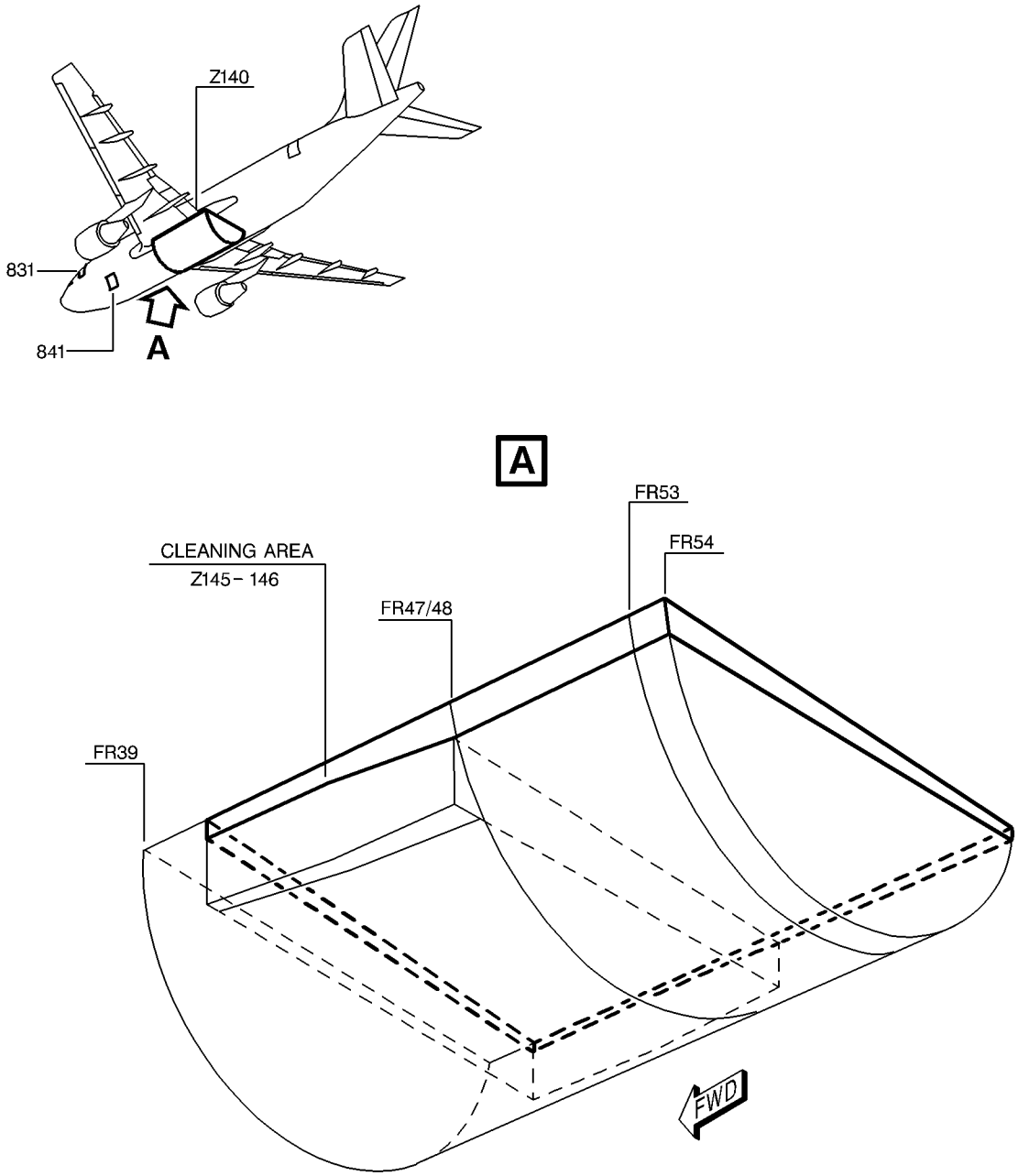
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 831(841).

(d)Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Remove equipment installed between FR40 and FR54:

- Passenger seats (Ref. 25-21-00, P. Block 401).
- Cabin attendant seats, if installed (Ref. 25-21-61, P. Block 401).
- Center galley units, if installed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Mid lavatories, if installed (Ref. 25-42-11, P. Block 401), (Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401) or (Ref. 25-42-81, P. Block 401).
- Ancillary equipment, if installed (Ref. 25-27-00, P. Block 1).



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Pressurized Zone Between Wing Center Box Main Gear Well and
Cabin Floor - Cleaning Area - Zones 145-146
Figure 705

(f)Remove floor panels between FR40 and FR54 (Ref. 53-10-25, P. Block 401).

(2)Cleaning of wiring installed in pressurized zone between wing center box main gear well and cabin floor (only contaminated wiring)

(a)Clean wiring if there is dust or lint contamination (Ref. ESPM 205500).

1 On AC/DC power distribution routes: 1P and 2P.

2 On engine control wiring routes: 1S and 2S.

3 On miscellaneous routes: 1M, 2M and 3M.

4 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.

5 On radio communication and navigation control wiring routes: 1C and 2C.

6 On radio communication and radio control, interphone, ADF wiring routes: 1R, 2R, 3R and 5R.

7 On VHF2 wiring routes: 2T.

8 On VOR1 wiring routes: 1U.

9 On UHF flux valve wiring routes: 1V and 2V.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install floor panels between FR40 and FR54 (Ref. 53-10-25, P. Block 401).

(c)Install equipment removed between FR40 and FR54:

- Passenger seats (Ref. 25-21-00, P. Block 401).
- Cabin attendant seats, if removed (Ref. 25-21-61, P. Block 401).
- Center galley units, if removed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Mid lavatories, if removed (Ref. 25-42-11, P. Block 401), Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401) or (Ref. 25-42-81, P. Block 401).
- Ancillary equipment, if removed (Ref. 25-27-00, P. Block 1).

(d)Close the FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.

R 6. Cleaning of PDU Supply EWIS Installed in Bay under AFT Cargo Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of PDU supply EWIS
R (only contaminated EWIS)
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

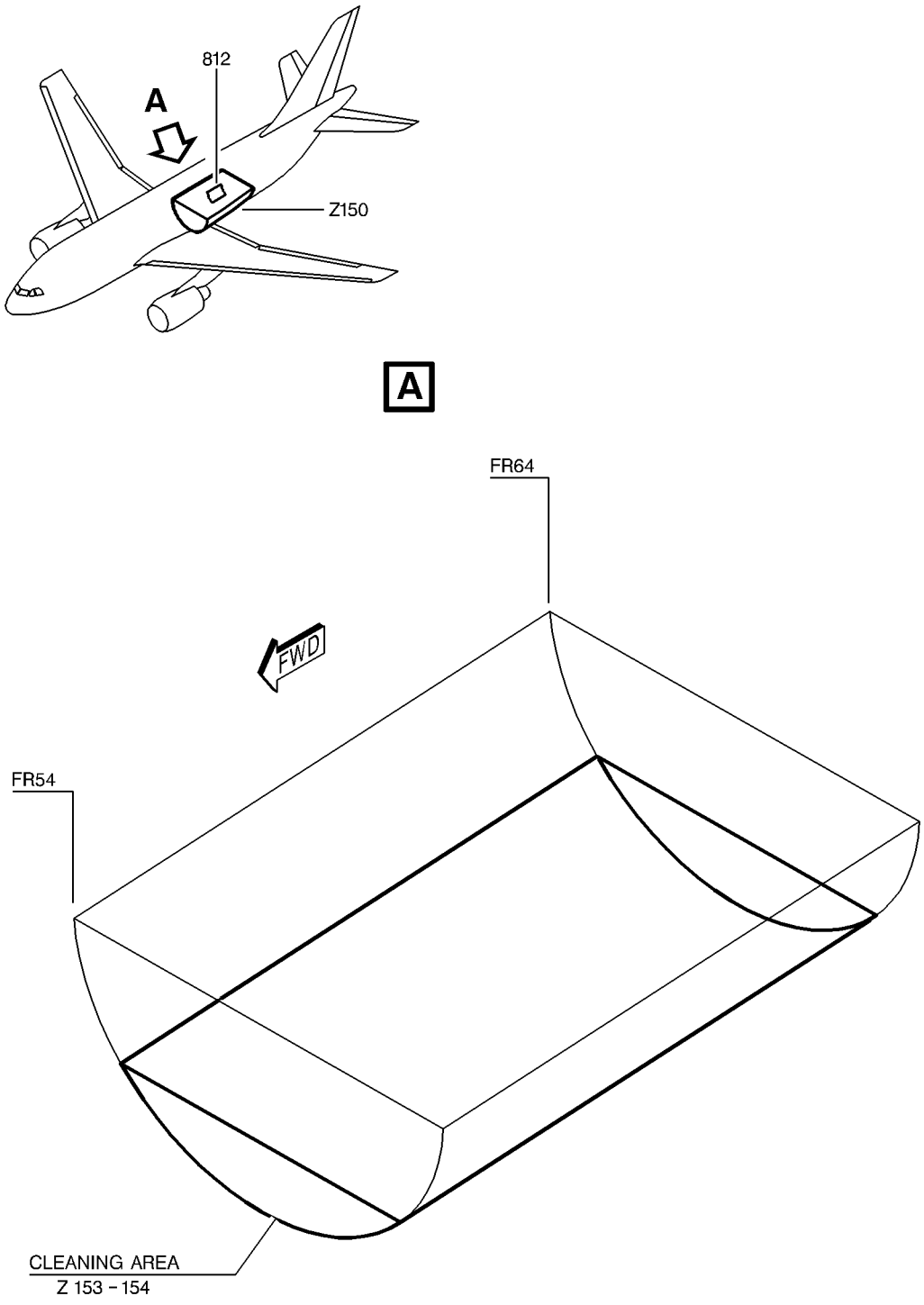
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 1.6 m (5 ft. 3 in.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 52-30-00, P. Block 1	Cargo Compartment Doors
- 52-30-00, P. Block 301	FWD and AFT Cargo Compartment Doors
- 53-10-33, P. Block 401	AFT Cargo Compartment Floor Panels
- ESPM 205500	

C. Procedure

(Ref. Fig. 706)

(1)Job set-up
(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c)Put an access platform in position at AFT cargo compartment door 812.
(d)Open AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Install door actuator safety lock on AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(f)Remove AFT cargo compartment floor panels between FR54 and FR64 (Ref. 53-10-33, P. Block 401).
(2)Cleaning of PDU supply wiring (only contaminated wiring)
(a)Clean wiring if there is dust, lint or hydraulic contamination (Ref. ESPM 205500).
1 On AC/DC feeder route: PDU supply wiring.
2 On flight control wiring route: receiver and transmitter antenna radio altimeter 1+2 wiring, VHF 2 antenna wiring.
(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install AFT cargo compartment floor panels between FR54 and FR64 (Ref. 53-10-33, P. Block 401).
(c)Remove door actuator safety lock from AFT cargo compartment door actuator (Ref. 52-30-00, P. Block 301).
(d)Close AFT cargo compartment door 812 (Ref. 52-30-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.



Bay Under AFT Cargo Compartment - Cleaning Area -
Zones 153-154
Figure 706

R 7. Cleaning of EWIS Installed in Flight Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do an inspection of EWIS installed in the flight compartment (only contaminated EWIS).

R NOTE : This is an EWIS (Electrical Wiring Interconnection System) procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-11-11, P. Block 401	Captain Seat
- 25-11-12, P. Block 401	First Officer Seat
- 25-11-13, P. Block 401	Third Occupant Seat
- 25-11-14, P. Block 401	Supplementary Seat
- 25-11-15, P. Block 401	Folding Seat
- 25-13-11, P. Block 401	Ceiling Panels
- 25-13-21, P. Block 401	Upper Sidewall Panels
- 25-13-31, P. Block 401	Lower Sidewall Panels
- 52-10-00, P. Block 1	Passenger/Crew Doors
- 53-10-21, P. Block 401	Flight Compartment Floor Panels
- ESPM 205500	

C. Procedure

(Ref. Fig. 707)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 831 (841).

(d)Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Remove Captain's seat (Ref. 25-11-11, P. Block 401).

(f)Remove First Officer's seat (Ref. 25-11-12, P. Block 401).

(g)Remove Third Occupant's seat (Ref. 25-11-13, P. Block 401).

(h)Remove supplementary seat, if installed (Ref. 25-11-14, P. Block 401).

(j)Remove folding seat, if installed (Ref. 25-11-15, P. Block 401).

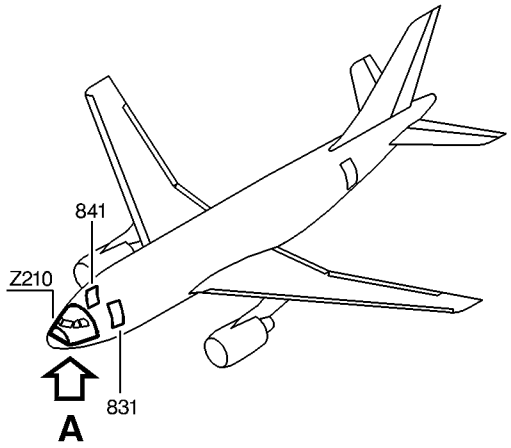
(k)Remove lining and furnishing panels installed in flight compartment:

- Ceiling panels (Ref. 25-13-11, P. Block 401).
- Upper sidewall panels (Ref. 25-13-21, P. Block 401).
- Lower sidewall panels (Ref. 25-13-31, P. Block 401).

(l)Remove flight compartment floor panels (Ref. 53-10-21, P. Block 401).

(m)Open panel(s) of 1VU, 2VU, 3VU, 4VU, 5VU, 6VU, 7VU, 8VU, 9VU, 11VU, 12VU, 13VU, 15VU, 20VU, 21VU, 22VU, 49VU, 50VU, 120VU, 219VU, 220VU, 221VU, 222VU and 241VU.

(2)Cleaning of wiring installed in the flight compartment (only contaminated



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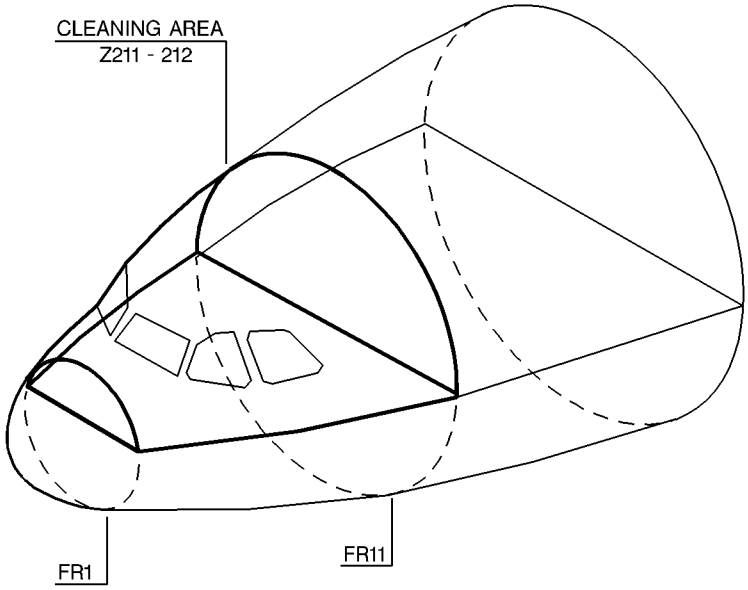

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Flight Compartment - Cleaning Area - Zones 211-212
Figure 707

wiring)
(a)Clean wiring if there is dust or lint contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: 3G and 3E.
2 In AC/DC power distribution routes: 1P, 2P, 3P, 4P and 5P.
3 On engine control wiring routes: 1S, 2S and 3S.
4 On miscellaneous routes: 1M, 2M and 3M.
5 On auto flight system 1 and 2 wiring routes: 1A, 2A, 3A and 4A.
6 On radio communication and navigation control wiring routes: 1C and 2C.
7 On radio communication, radio control and interphone wiring routes: 1R, 2R and 3R.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install flight compartment floor panels (Ref. 53-10-21, P. Block 401).
(c)Close panel(s) of 1VU, 2VU, 3VU, 4VU, 5VU, 6VU, 7VU, 8VU, 9VU, 11VU, 12VU, 13VU, 15VU, 20VU, 21VU, 22VU, 49VU, 50VU, 120VU, 219VU, 220VU, 221VU, 222VU and 241VU.
(d)Install lining and furnishing panels removed in flight compartment:
- Ceiling panels (Ref. 25-13-11, P. Block 401).
- Upper sidewall panels (Ref. 25-13-21, P. Block 401).
- Lower sidewall panels (Ref. 25-13-31, P. Block 401).
(e)Install Captain's seat (Ref. 25-11-11, P. Block 401).
(f)Install First Officer's seat (Ref. 25-11-12, P. Block 401).
(g)Install Third Occupant's seat (Ref. 25-11-13, P. Block 401).
(h)Install supplementary seat, if removed (Ref. 25-11-14, P. Block 401).
(j)Install folding seat, if removed (Ref. 25-11-15, P. Block 401).
(k)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(l)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(m)Remove access platform.

8. Cleaning of G, E and P Routes Within FWD Main Deck Utility Overhead Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

The purpose of this procedure is to do a cleaning of G, E and P routes within the zone (only contaminated EWIS).

NOTE : This is an EWIS (Electrical Wiring Interconnection System) procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-13, P. Block 401	Utility Area Ceiling Panels
- 25-31-11, P. Block 401	FWD Galley Unit
- 25-31-12, P. Block 401	FWD Galley Unit
- 25-31-13, P. Block 401	FWD Galley Unit
- 25-31-14, P. Block 401	FWD Galley Unit
- 25-41-11, P. Block 401	Lavatory A
- 25-41-31, P. Block 401	Lavatory C
- 25-41-41, P. Block 401	Lavatory J
- 25-41-51, P. Block 401	Lavatory N
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

(Ref. Fig. 708)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 831(841).

(d)Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Remove equipment installed between FR11 and FR18:

- Forward galley units, if installed (Ref. 25-31-11, P. Block 401), (Ref. 25-31-12, P. Block 401), (Ref. 25-31-13, P. Block 401) or (Ref. 25-31-14, P. Block 401).
- Forward lavatories, if installed (Ref. 25-41-11, P. Block 401), (Ref. 25-41-31, P. Block 401), (Ref. 25-41-41, P. Block 401) or (Ref. 25-41-51, P. Block 401).

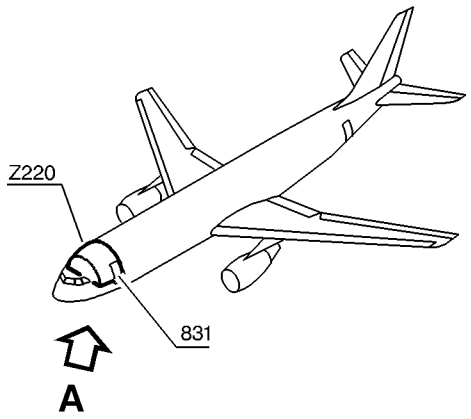
(f)Remove ceiling panels between FR11 and FR18 (Ref. 25-23-13, P. Block 401).

(2)Cleaning of G, E and P routes within the zone (only contaminated wiring)

(a)Clean wiring if there is dust contamination (Ref. ESPM 205500).

1 On AC/DC feeder routes: 3G and 3E.

2 On AC/DC power distribution routes: 1P, 2P, and 3P.



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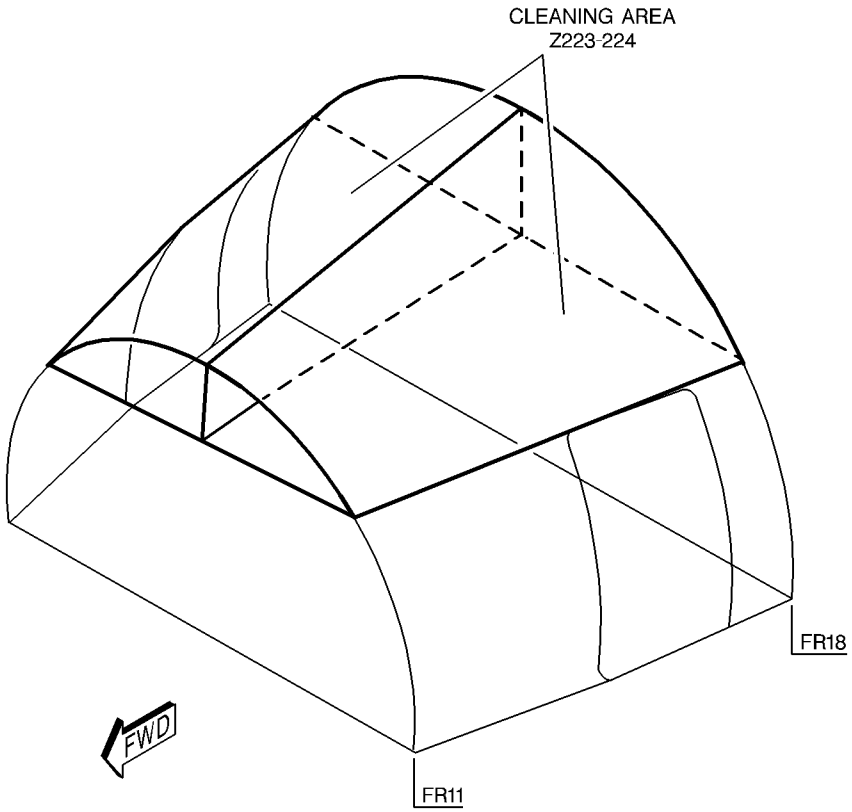

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FWD Main Deck Utility Overhead Compartment - Cleaning Area - Zones 223-224
Figure 708

3 On engine control wiring route: 3S.
4 On miscellaneous routes: 1M, 2M and 3M.
5 On interphone and public address wiring routes: 3R and 4R.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install ceiling panels between FR11 and FR18 (Ref. 25-23-13, P. Block 401).
(c)Install equipment removed between FR11 and FR18:
- Forward galley units, if removed (Ref. 25-31-11, P. Block 401), (Ref. 25-31-12, P. Block 401), (Ref. 25-31-13, P. Block 401) or (Ref. 25-31-14, P. Block 401).
- Forward lavatories, if removed (Ref. 25-41-11, P. Block 401), (Ref. 25-41-31, P. Block 401), (Ref. 25-41-41, P. Block 401) or (Ref. 25-41-51, P. Block 401).

(d)Close the FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 9. Cleaning of All EWIS Installed in FWD Main Deck Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in the FWD main deck compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-21-00, P. Block 401	Passenger Compartment Seats
- 25-23-21, P. Block 401	Upper Sidewall Panels
- 25-23-31, P. Block 401	Lower Sidewall Panels
- 25-23-41, P. Block 401	Door Frame Linings
- 25-27-00, P. Block 1	Ancillary Equipment
- 25-31-11, P. Block 401	FWD Galley Unit
- 25-31-12, P. Block 401	FWD Galley Unit
- 25-31-13, P. Block 401	FWD Galley Unit
- 25-31-14, P. Block 401	FWD Galley Unit
- 25-32-11, P. Block 401	Center Galley Unit
- 25-32-12, P. Block 401	Center Galley Unit
- 25-32-13, P. Block 401	Center Galley Unit
- 25-32-14, P. Block 401	Center Galley Unit
- 25-41-41, P. Block 401	Lavatory J
- 25-41-51, P. Block 401	Lavatory N
- 25-42-11, P. Block 401	Lavatories O + P
- 25-42-21, P. Block 401	Lavatory H
- 25-42-31, P. Block 401	Lavatory K
- 25-42-41, P. Block 401	Lavatory L
- 25-42-51, P. Block 401	Lavatory M
- 25-42-61, P. Block 401	Lavatory W
- 25-42-71, P. Block 401	Lavatory T
- 25-42-81, P. Block 401	Lavatory L+M Variable
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

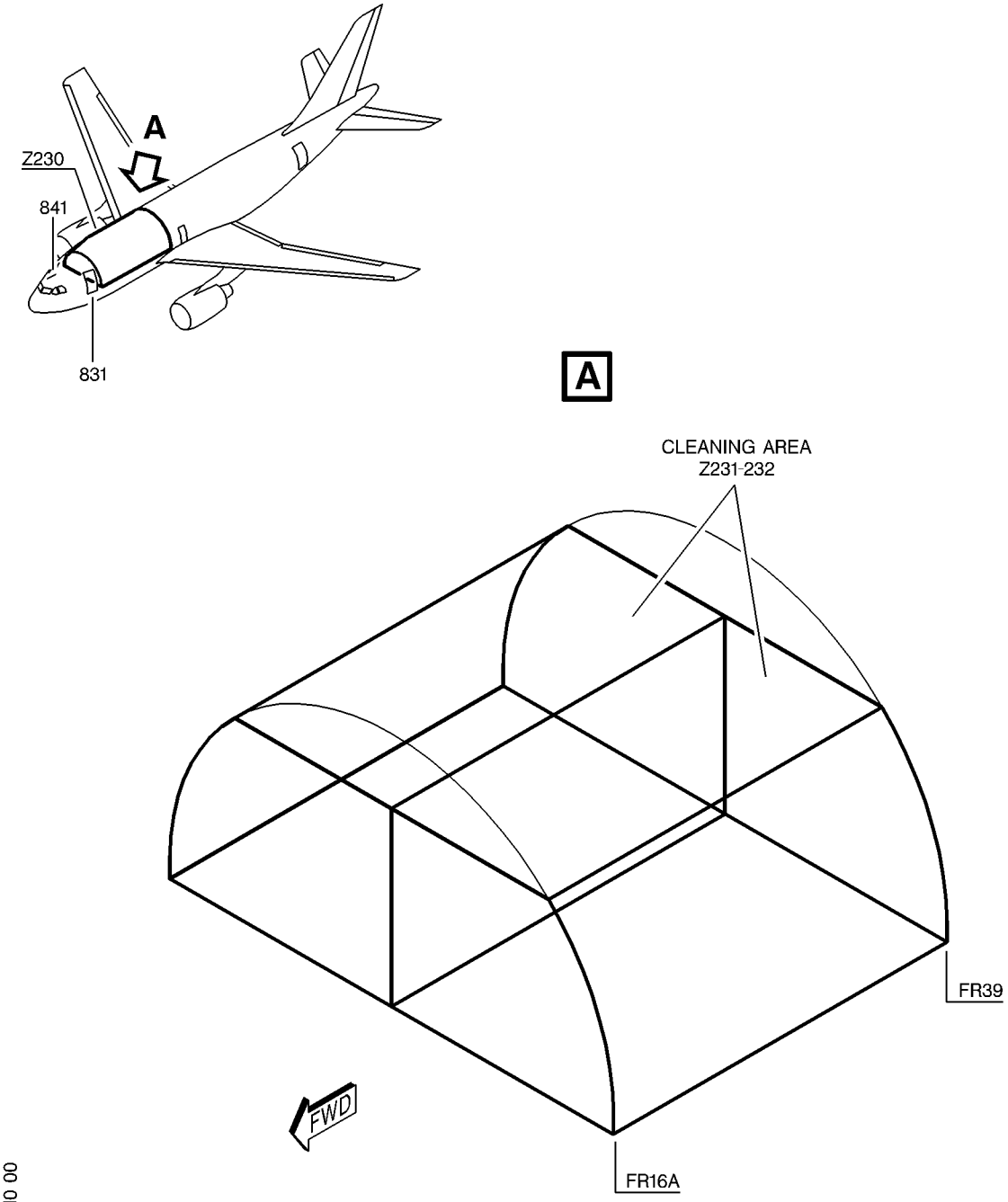
(Ref. Fig. 709)

(1)Job set-up

(a)Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b)Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c)Put an access platform in position at zone 831(841).



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FWD Main Deck Compartment - Cleaning Area - Zones 231-232
Figure 709

(d)Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e)Remove equipment installed between FR16A and FR39:
- Forward galley units, if installed (Ref. 25-31-11, P. Block 401), (Ref. 25-31-12, P. Block 401), (Ref. 25-31-13, P. Block 401) or (Ref. 25-31-14, P. Block 401).
- Center galley units, if installed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Forward lavatories, if installed (Ref. 25-41-41, P. Block 401), or (Ref. 25-41-51, P. Block 401).
- Mid lavatories, if installed (Ref. 25-42-11, P. Block 401), (Ref. 25-42-21, P. Block 401), (Ref. 25-42-31, P. Block 401), (Ref. 25-42-41, P. Block 401), (Ref. 25-42-51, P. Block 401), (Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401) or (Ref. 25-42-81, P. Block 401).
- Passenger seats adjacent to sidewall panels to be removed (Ref. 25-21-00, P. Block 401).
- Ancillary equipment, if installed (Ref. 25-27-00, P. Block 1).

(f)Remove linings and furnishings between FR16A and FR39:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).
- Door frame linings (Ref. 25-23-41, P. Block 401).

(2)Cleaning of all wiring installed in FWD main deck compartment (only contaminated wiring)
(a)Clean wiring if there is dust or lint contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: 6G, 6E, generator 2 emergency feeder, RH only (FR26).
2 On engine control wiring routes: 1S, 2S, 3S - cabin temperature sensors.
3 On miscellaneous routes: M, 1M, 2M - lighting covers, wing scan light.
4 On radio and navigation routes: 1C, 2C, 2U, 3R, 4R, 1T, 7T, 8T, 9T all and 3T.
5 On auto-flight wiring routes: 1A, 3A, 4A all and 2A.

(3)Close-up
(a)Make certain that the work area is clean and clear of tools and other items.
(b)Install linings and furnishings between FR16A and FR39:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).
- Emergency exit door frame linings (Ref. 25-23-41, P. Block 401).

(c)Install equipment removed between FR16A and FR39:
- Forward galley units, if removed (Ref. 25-31-11, P. Block 401), (Ref. 25-31-12, P. Block 401), (Ref. 25-31-13, P. Block 401) or (Ref. 25-31-14, P. Block 401).
- Center galley units, if removed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Forward lavatories, if removed (Ref. 25-41-41, P. Block 401), or (Ref. 25-41-51, P. Block 401).
- Mid lavatories, if removed (Ref. 25-42-11, P. Block 401),

(Ref. 25-42-21, P. Block 401), (Ref. 25-42-31, P. Block 401), (Ref. 25-42-41, P. Block 401), (Ref. 25-42-51, P. Block 401), (Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401) or (Ref. 25-42-81, P. Block 401).

- Passenger seats adjacent to sidewall panels (Ref. 25-21-00, P. Block 401).
- Ancillary equipment, if removed (Ref. 25-27-00, P. Block 1).

(d)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.

R 10. Cleaning of All EWIS Installed in FWD Main Deck Overhead Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in the FWD main deck overhead compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels
- 25-24-11, P. Block 401	Sidewall Overhead Stowage Compartment
- 25-24-21, P. Block 401	Center Overhead Stowage Compartment
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

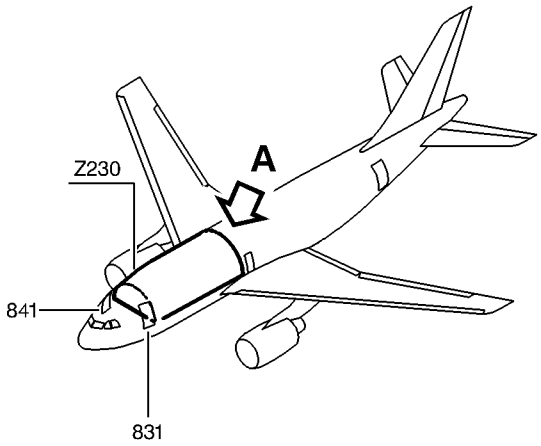
C. Procedure

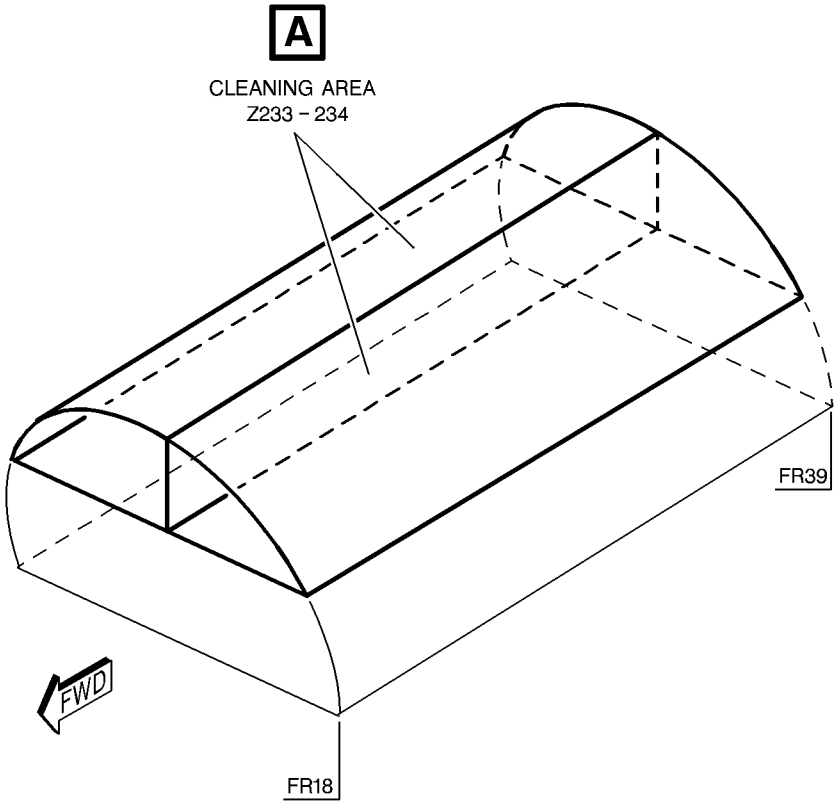
(Ref. Fig. 710)

(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position at zone 831(841).
(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e) Remove center overhead stowage compartment, if installed between FR18 and FR39 (Ref. 25-24-21, P. Block 401).
(f) Remove sidewall overhead stowage compartment, if installed between FR18 and FR39 (Ref. 25-24-11, P. Block 401).
(g) Remove ceiling panels between FR18 and FR39 (Ref. 25-23-11, P. Block 401).

(2) Cleaning of all wiring installed in FWD main deck overhead compartment (only contaminated wiring)
(a) Clean wiring if there is dust contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: 3G, 3E - APU generator feeder and energization, 6G, 6E - generator 2 emergency/excitation at FR26.
2 On AC/DC power distribution routes: 3P, 1P.
3 On engine control wiring routes: 1S, 2S - cabin temperature sensors.
4 On miscellaneous routes: M, 1M, 2M, 3M - lighting covers, wing scan light.
5 On radio and navigation wiring routes: 1C, 2C, 2U, 3R, 4R, 1T, 7T, 8T, 9T.
6 On auto-flight wiring routes: 1A, 2A, 4A.

(3) Close-up
(a) Make certain that the work area is clean and clear of tools and other





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FWD Main Deck Overhead Compartment - Cleaning Area -
Zones 233-234
Figure 710

items.
(b)Install ceiling panels between FR18 and FR39 (Ref. 25-23-11, P. Block 401).
(c)Install sidewall overhead stowage compartment, if removed between FR18 and FR39 (Ref. 25-24-11, P. Block 401).
(d)Install center overhead stowage compartment, if removed between FR18 and FR39 (Ref. 25-24-21, P. Block 401).
(e)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 11. Cleaning of All EWIS Installed in Center Main Deck Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in the center main deck compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-21-00, P. Block 401	Passenger Compartment Seats
- 25-23-21, P. Block 401	Upper Sidewall Panels
- 25-23-31, P. Block 401	Lower Sidewall Panels
- 25-23-41, P. Block 401	Door Frame Linings
- 25-27-00, P. Block 1	Ancillary Equipment
- 25-32-11, P. Block 401	Center Galley Unit
- 25-32-12, P. Block 401	Center Galley Unit
- 25-32-13, P. Block 401	Center Galley Unit
- 25-32-14, P. Block 401	Center Galley Unit
- 25-41-42, P. Block 401	Lavatory L
- 25-41-52, P. Block 401	Lavatory M
- 25-42-61, P. Block 401	Lavatory W
- 25-42-71, P. Block 401	Lavatory T
- 25-42-81, P. Block 401	Lavatory L+M Variable
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

(Ref. Fig. 711)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

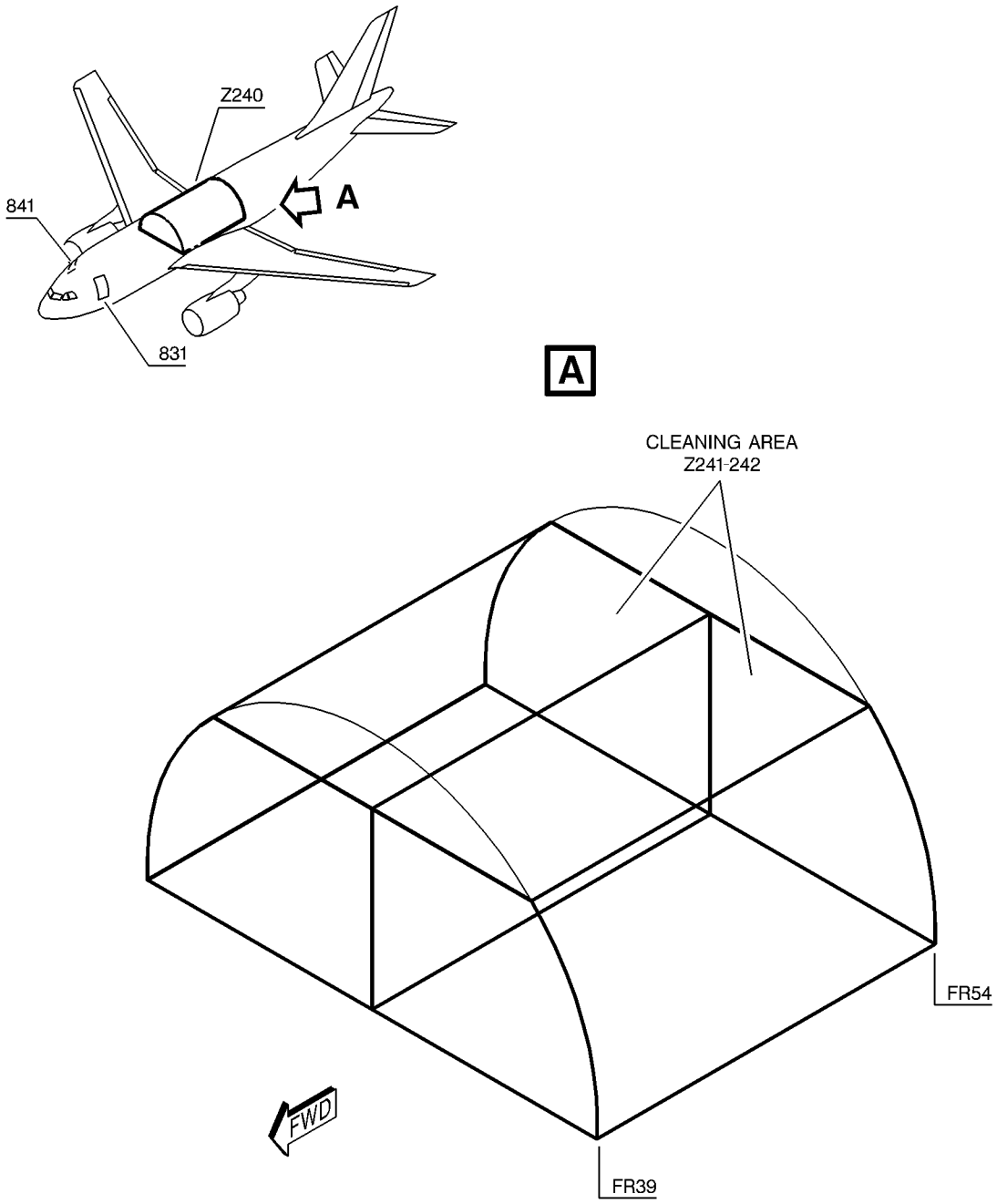
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 831(841).

(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e) Remove equipment installed between FR39 and FR54:

- Center galley units, if installed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Mid lavatories, if installed (Ref. 25-42-41, P. Block 401), (Ref. 25-42-51, P. Block 401), (Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401), or (Ref. 25-42-81, P. Block 401).
- Passenger seats adjacent to sidewall panels to be removed (Ref. 25-21-00, P. Block 401).



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Center Main Deck Compartment - Cleaning Area - Zones 241-242
Figure 711

- Ancillary equipment, if installed (Ref. 25-27-00, P. Block 1).

(f)Remove linings and furnishings between FR39 and FR54:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).
- Door frame linings (Ref. 25-23-41, P. Block 401).

(2)Cleaning of all wiring installed in center main deck compartment (only contaminated wiring)

(a)Clean wiring if there is dust or lint contamination (Ref. ESPM 205500).

1 On AC/DC feeder routes: 6G, 6E, generator 2 emergency feeder, RH only.
2 On engine control wiring route: 1S.
3 On miscellaneous routes: 1M, 2M - lighting covers, wing scan light.
4 On radio and navigation wiring routes: 4R - all.
5 On auto-flight wiring routes: 2A, 3A.

(3)Close-up

(a)Make certain that the work area is clean and clear of tools and other items.

(b)Install linings and furnishings between FR39 and FR54:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).
- Emergency exit door frame linings (Ref. 25-23-41, P. Block 401).

(c)Install equipment removed between FR39 and FR54:
- Center galley units, if removed (Ref. 25-32-11, P. Block 401), (Ref. 25-32-12, P. Block 401), (Ref. 25-32-13, P. Block 401) or (Ref. 25-32-14, P. Block 401).
- Mid lavatories, if removed (Ref. 25-42-41, P. Block 401), (Ref. 25-42-51, P. Block 401), (Ref. 25-42-61, P. Block 401), (Ref. 25-42-71, P. Block 401), or (Ref. 25-42-81, P. Block 401).
- Passenger seats adjacent to sidewall panels (Ref. 25-21-00, P. Block 401).
- Ancillary equipment, if removed (Ref. 25-27-00, P. Block 1).

(d)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.

R 12. Cleaning of All EWIS Installed in the Center Main Deck Overhead Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in the center main deck overhead compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels
- 25-24-11, P. Block 401	Overhead Stowage Compartment
- 25-24-21, P. Block 401	Center Overhead Stowage Compartment
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

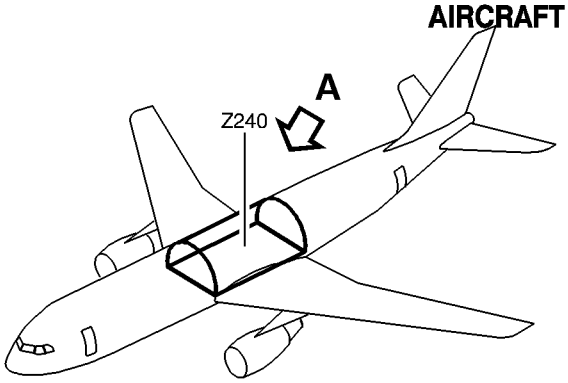
C. Procedure

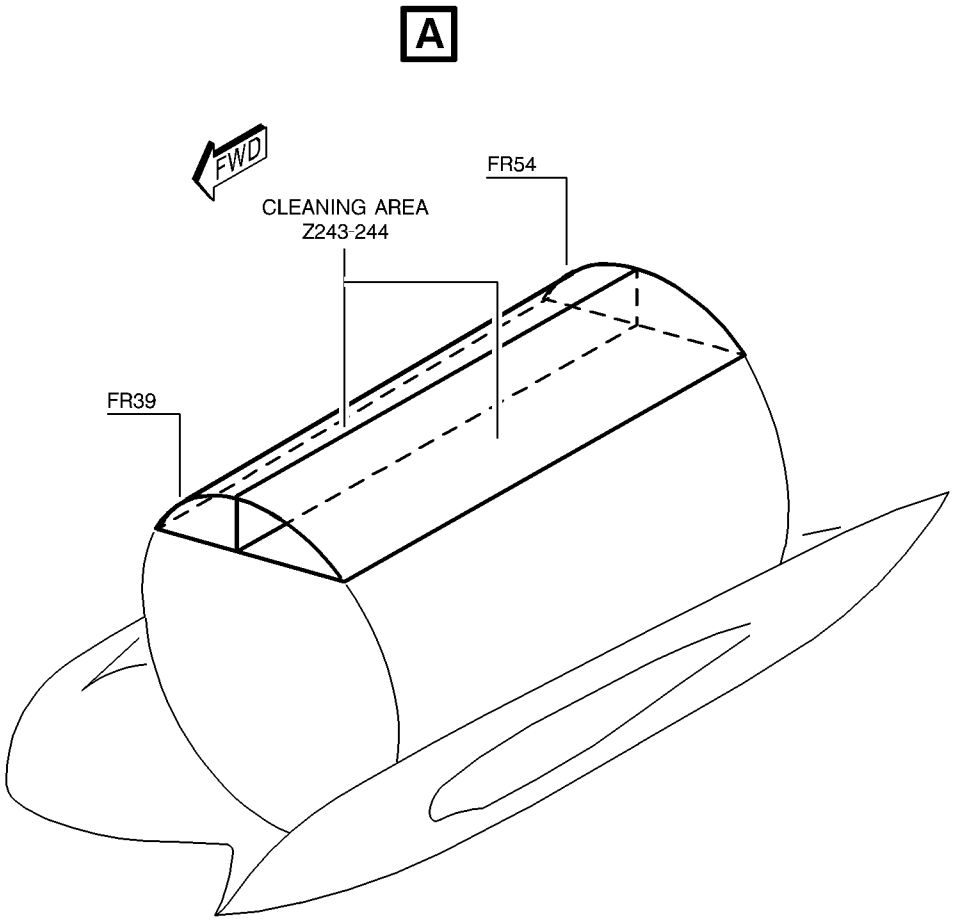
(Ref. Fig. 712)

(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position at zone 831(841).
(d) Open FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e) Remove overhead stowage compartment between FR39 and FR54:
- Remove overhead stowage compartment (Ref. 25-24-11, P. Block 401).
- Remove center overhead stowage compartment, if installed (Ref. 25-24-21, P. Block 401).
(f) Remove ceiling panels between FR39 and FR54 (Ref. 25-23-11, P. Block 401).

(2) Cleaning of all wiring installed in center main deck overhead compartment (only contaminated wiring)
(a) Clean wiring if there is dust contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: 3G and 3E.
2 On AC/DC power distribution routes: 3P.
3 On engine control wiring routes: 1S, 2S and 3S.
4 On miscellaneous routes: 1M, 2M and 3M.
5 On generator excitation routes: 6G and 6E.

(3) Close-up
(a) Install ceiling panels between FR39 and FR54 (Ref. 25-23-11, P. Block 401).
(b) Install overhead stowage compartment between FR39 and FR54:
- Install overhead stowage compartment (Ref. 25-24-11, P. Block 401).
- Install center overhead stowage compartment, if removed





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Center Main Deck Overhead Compartment - Cleaning Area -
Zones 243-244
Figure 712

(Ref. 25-24-21, P. Block 401).
(c)Make certain that the work area is clean and clear of tools and other items.
(d)Close FWD passenger/crew door 831(841) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 13. Cleaning of All EWIS Installed in Aft Main Deck Compartment (Only
R Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in aft main deck compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-21-00, P. Block 401	Passenger Compartment Seats
- 25-21-51, P. Block 401	Cabin Attendant Swivel Seat
- 25-23-21, P. Block 401	Upper Sidewall Panels
- 25-23-31, P. Block 401	Lower Sidewall Panels
- 25-23-41, P. Block 401	Door Frame Linings
- 25-27-00, P. Block 1	Ancillary Equipment
- 25-33-11, P. Block 401	Aft Galley Unit
- 25-33-12, P. Block 401	Aft Galley Unit
- 25-33-14, P. Block 401	Aft Galley Unit
- 25-43-21, P. Block 401	Lavatory - U
- 25-43-31, P. Block 401	Lavatory - V
- 25-43-41, P. Block 401	Lavatory - X
- 25-43-51, P. Block 401	Lavatory - Y
- 25-43-61, P. Block 401	Lavatory - Z
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

(Ref. Fig. 713)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

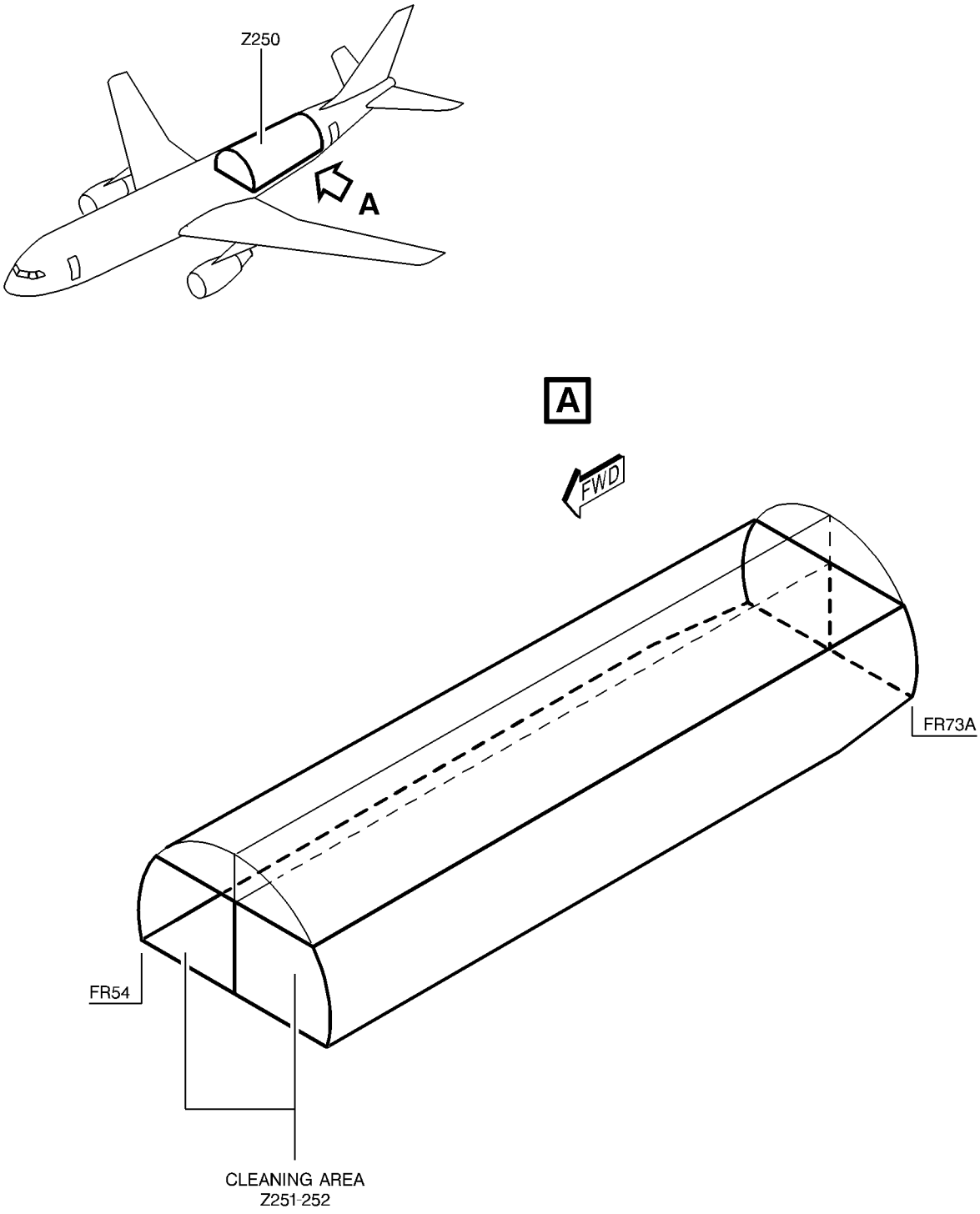
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 833(843).

(d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e) Remove equipment installed between FR54 and FR73A:

- Passenger seats adjacent to sidewall panels to be removed (Ref. 25-21-00, P. Block 401).
- Cabin attendant swivel seats, if installed (Ref. 25-21-51, P. Block 401).
- Aft galley units, if installed (Ref. 25-33-11, P. Block 401), (Ref. 25-33-12, P. Block 401) or (Ref. 25-33-14, P. Block 401).
- Aft lavatories, if installed (Ref. 25-43-21, P. Block 401), (Ref. 25-43-31, P. Block 401), (Ref. 25-43-41, P. Block 401)



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Aft Main Deck Compartment - Cleaning Area - Zones 251-252
Figure 713

(Ref. 25-43-51, P. Block 401), or (Ref. 25-43-61, P. Block 401).
- Ancillary equipment, if installed (Ref. 25-27-00, P. Block 1).

(f)Remove linings and furnishings between FR54 and FR73A:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).

(2)Cleaning of all wiring installed in aft main deck compartment (only contaminated wiring)

(a)Clean wiring if there is dust contamination (Ref. ESPM 205500).

1 On AC/DC power distribution routes: : P routes to galleys and toilets.
2 On engine control wiring routes: 1S and 2S.
3 On miscellaneous routes: M, 1M and 2M.
4 On other wiring routes: 3R, 4R and 5R.

(3)Close-up

(a)Install linings and furnishings between FR54 and FR73A:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels (Ref. 25-23-31, P. Block 401).

(b)Install equipment removed between FR54 and FR73A:
- Passenger seats adjacent to sidewall panels (Ref. 25-21-00, P. Block 401).
- Cabin attendant swivel seats, if removed (Ref. 25-21-51, P. Block 401).
- Aft galley units, if removed (Ref. 25-33-11, P. Block 401), (Ref. 25-33-12, P. Block 401) or (Ref. 25-33-14, P. Block 401).
- Aft lavatories, if removed (Ref. 25-43-21, P. Block 401), (Ref. 25-43-31, P. Block 401), (Ref. 25-43-41, P. Block 401) (Ref. 25-43-51, P. Block 401), or (Ref. 25-43-61, P. Block 401).
- Ancillary equipment, if removed (Ref. 25-27-00, P. Block 1).

(c)Make certain that the work area is clean and clear of tools and other items.

(d)Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.

R 14. Cleaning of All EWIS Installed in the Aft Main Deck Overhead Compartment
R (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in the aft main deck overhead compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-11, P. Block 401	Ceiling Panels
- 25-24-11, P. Block 401	Overhead Stowage Compartment
- 25-24-21, P. Block 401	Center Overhead Stowage Compartment
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

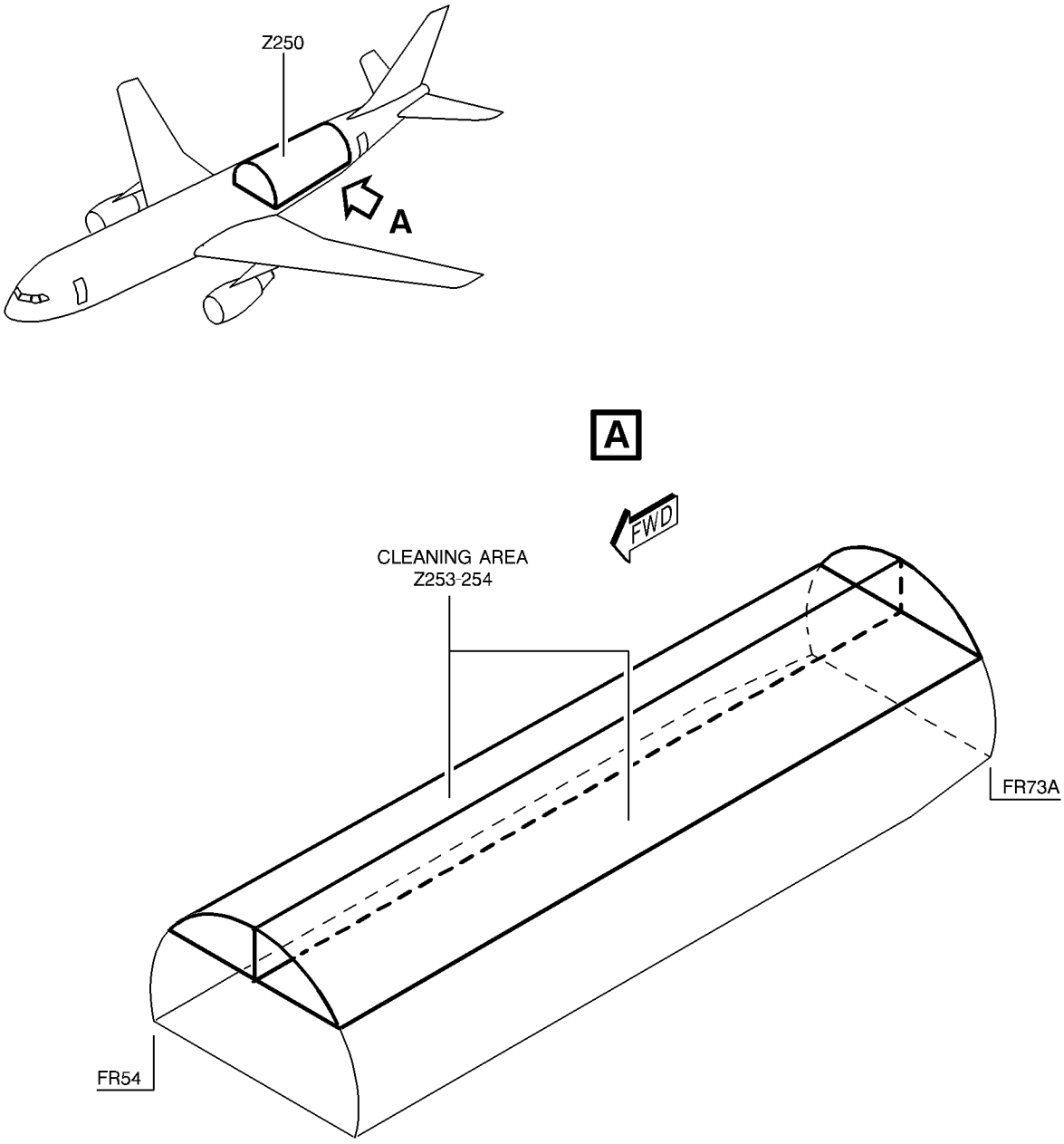
C. Procedure

(Ref. Fig. 714)

(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Put an access platform in position at zone 833(843).
(d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
(e) Remove overhead stowage compartment between FR54 and FR73A:
- Remove overhead stowage compartment (Ref. 25-24-11, P. Block 401).
- Remove center overhead stowage compartment, if installed (Ref. 25-24-21, P. Block 401).
(f) Remove ceiling panels between FR54 and FR71 (Ref. 25-23-11, P. Block 401).

(2) Cleaning of all wiring installed in aft main deck overhead compartment (only contaminated wiring)
(a) Clean wiring if there is dust contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: 3G and 3E - APU generator feeder and energization.
2 On AC/DC power distribution routes: 3P - Galley power.
3 On engine control wiring routes: 2S and 3S - Cabin temperature sensors.
4 On miscellaneous routes: 1M, 2M and 3M.
5 On radio and navigation wiring routes: 1C, 2C, 2U, 3R, 4R, 5R, 7T and 8T.

(3) Close-up
(a) Install ceiling panels between FR54 and FR71 (Ref. 25-23-11, P. Block 401).



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Aft Main Deck Overhead Compartment - Cleaning Area - Zones 253-254
Figure 714

(b)Install overhead stowage compartment between FR54 and FR73A:
- Install overhead stowage compartment (Ref. 25-24-11, P. Block 401).
- Install center overhead stowage compartment, if removed (Ref. 25-24-21, P. Block 401).

(c)Make certain that the work area is clean and clear of tools and other items.

(d)Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).

(f)Remove access platform.

R 15. Cleaning of All EWIS Installed in Aft Main Deck Utility Areas (Only
R Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in aft main deck utility areas (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

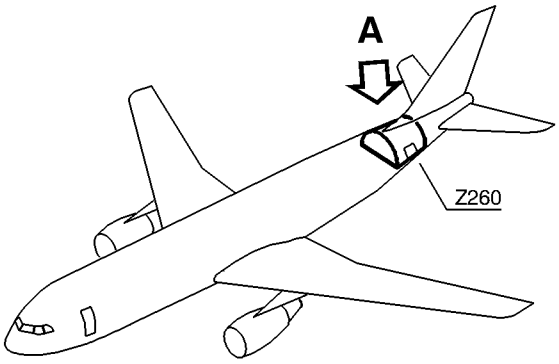
B. Equipment and Materials

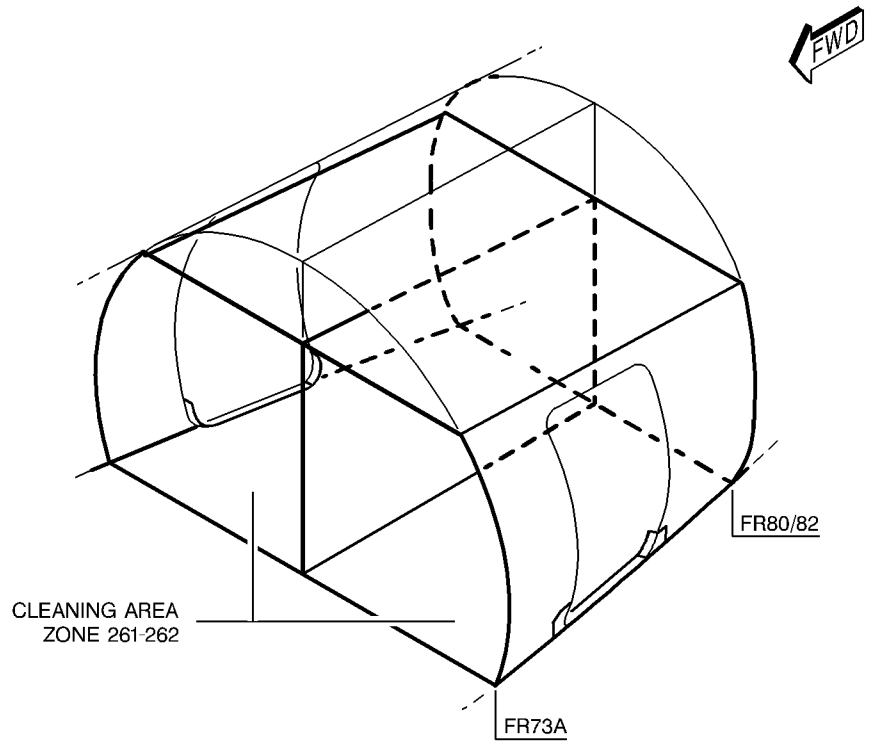
ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-21-51, P. Block 401	Cabin Attendant Swivel Seat
- 25-21-61, P. Block 401	Cabin Attendant Seat, Freestanding
- 25-23-21, P. Block 401	Upper Sidewall Panels
- 25-23-31, P. Block 401	Lower Sidewall Panels
- 25-23-41, P. Block 401	Door Frame Linings
- 25-33-13, P. Block 401	Aft Galley Unit
- 25-43-11, P. Block 401	Aft Lavatory
- 25-43-71, P. Block 401	Lavatory - Q (L)
- 25-43-75, P. Block 401	Lavatory - G (R)
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

(Ref. Fig. 715)

(1) Job set-up
  (a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
  (b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
  (c) Put an access platform in position at zone 833(843).
  (d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
  (e) Remove equipment installed between FR73A and FR80/82:
    - Cabin attendant swivel seats, if installed (Ref. 25-21-51, P. Block 401).
    - Freestanding cabin attendant seat, if installed (Ref. 25-21-61, P. Block 401).
    - Aft galley units, if installed (Ref. 25-33-13, P. Block 401).
    - Aft lavatories, if installed (Ref. 25-43-11, P. Block 401), (Ref. 25-43-71, P. Block 401) or (Ref. 25-43-75, P. Block 401).
  (f) Remove linings and furnishings between FR73A and FR80/82:
    - Upper sidewall panels (Ref. 25-23-21, P. Block 401).
    - Lower sidewall panels, if installed (Ref. 25-23-31, P. Block 401).
    - Aft passenger/crew door frame linings (Ref. 25-23-41, P. Block 401).
(2) Cleaning of all wiring installed in aft main deck utility areas (only contaminated wiring)





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Aft Main Deck Utility Areas - Cleaning Area - Zones 261-262
Figure 715

(a)Clean wiring if there is dust or lint contamination (Ref. ESPM 205500).
1 On AC/DC power distribution routes: 1P and 2P - Vacuum cleaner L/R sidewall FR73.
2 On engine control wiring routes: 2S - Door area heating.
3 On miscellaneous routes: 1M, 2M and 3M - Power supply unit and aft cabin lighting panels.
4 On radio and navigation wiring routes: 1U, 3R and 4R.

(3)Close-up
(a)Install linings and furnishings between FR73A and FR80/82:
- Upper sidewall panels (Ref. 25-23-21, P. Block 401).
- Lower sidewall panels, if removed (Ref. 25-23-31, P. Block 401).
- Aft passenger/crew door frame linings (Ref. 25-23-41, P. Block 401).

(b)Install equipment removed between FR73A and FR80/82:
- Cabin attendant swivel seats, if removed (Ref. 25-21-51, P. Block 401).
- Freestanding cabin attendant seat, if removed (Ref. 25-21-61, P. Block 401).
- Aft galley units, if removed (Ref. 25-33-13, P. Block 401).
- Aft lavatories, if removed (Ref. 25-43-11, P. Block 401), (Ref. 25-43-71, P. Block 401), or (Ref. 25-43-75, P. Block 401).

(c)Make certain that the work area is clean and clear of tools and other items.
(d)Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 16. Cleaning of All EWIS Installed in Aft Main Deck Utility Overhead
R Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job

R The purpose of this procedure is to do a cleaning of all EWIS installed
R in aft main deck utility overhead compartment (only contaminated EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 4.5 m (14.7 ft.)
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- 25-23-13, P. Block 401	Utility Area Ceiling Panels
- 25-33-13, P. Block 401	Aft Galley Unit
- 25-43-11, P. Block 401	Aft Lavatory
- 25-43-71, P. Block 401	Lavatory - Q (L)
- 25-43-75, P. Block 401	Lavatory - G (R)
- 52-10-00, P. Block 1	Passenger/Crew Doors
- ESPM 205500	

C. Procedure

(Ref. Fig. 716)

(1) Job set-up

(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).

(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).

(c) Put an access platform in position at zone 833(843).

(d) Open aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).

(e) Remove linings and furnishings between FR73A and FR80/82:
- Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401).

(f) Remove equipment installed between FR73A and FR80/82:
- Aft galley units, if installed (Ref. 25-33-13, P. Block 401).
- Aft lavatories, if installed (Ref. 25-43-11, P. Block 401), (Ref. 25-43-71, P. Block 401) or (Ref. 25-43-75, P. Block 401).

(2) Cleaning of all wiring installed in aft main deck utility areas (only contaminated wiring)

(a) Clean wiring if there is dust contamination (Ref. ESPM 205500).

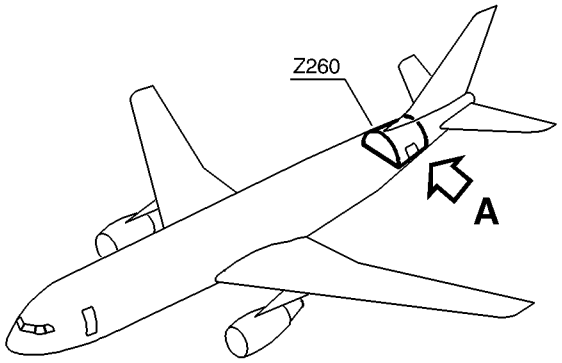
1 On AC/DC feeder routes: 3G and 3E - APU generator feeder and energization.

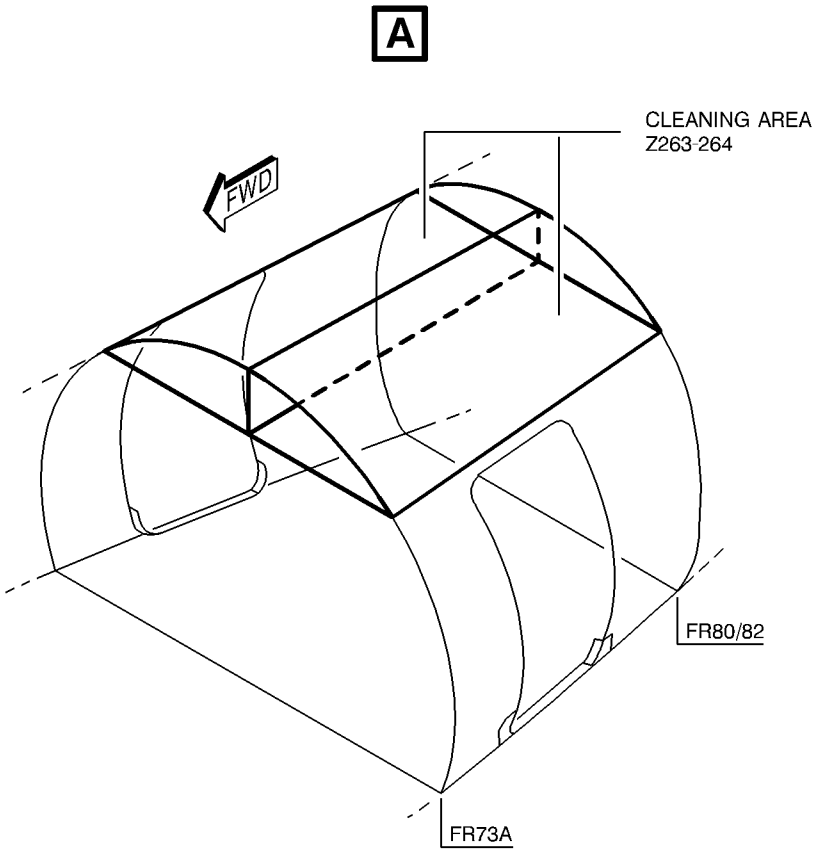
2 On AC/DC power distribution routes: 1P, 2P and 3P - Toilet vacuum system and vacuum cleaner.

3 On engine control wiring routes: 2S and 3S - Cabin temperature sensors.

4 On miscellaneous routes: 1M, 2M and 3M - Aft cabin lighting.

5 On radio and navigation wiring routes: 1C, 2C, 1U, 2U, 3R, 4R, 7T and 8T.





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Aft Main Deck Utility Overhead Compartment -
Cleaning Area - Zones 263-264
Figure 716

(3)Close-up
(a)Install equipment removed between FR73A and FR80/82:
- Aft galley units, if removed (Ref. 25-33-13, P. Block 401).
- Aft lavatories, if removed (Ref. 25-43-11, P. Block 401), (Ref. 25-43-71, P. Block 401) or (Ref. 25-43-75, P. Block 401).

(b)Install linings and furnishings between FR73A and FR80/82:
- Aft utility area ceiling panels (Ref. 25-23-13, P. Block 401). P. Block 401).

(c)Make certain that the work area is clean and clear of tools and other items.
(d)Close aft passenger/crew door 833(843) (Ref. 52-10-00, P. Block 1).
(e)Disconnect the aircraft electrical ground connection (Ref. 24-00-00, P. Block 301).
(f)Remove access platform.

R 17. Cleaning of All Power Feeder EWIS Installed in APU and Accessory
R Compartment (Only Contaminated EWIS) (EWIS)

A. Reason for the Job
The purpose of this procedure is to do a cleaning of all power feeder
R EWIS installed in APU and accessory compartment (only contaminated
R EWIS).
R NOTE : This is an EWIS (Electrical Wiring Interconnection System)
R procedure. EWIS is defined in ESPM 203311.

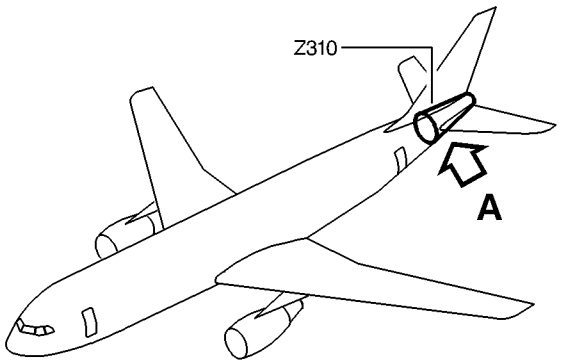
B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 7 m (23 ft.)
(2)	Circuit Breaker Safety Clips and Tags
(3)	Warning Notice
Referenced Procedures	
- 24-00-00, P. Block 301	General - Servicing
- 24-41-00, P. Block 301	AC External Power Control
- ESPM 205500	

C. Procedure
(Ref. Fig. 717)
(1) Job set-up
(a) Make sure that the aircraft electrical circuits are de-energized (Ref. 24-41-00, P. Block 301).
(b) Electrically ground the aircraft (Ref. 24-00-00, P. Block 301).
(c) Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
124VU	APU/START	50KA	E70

(d) Put a warning notice in position in flight compartment, prohibiting start of APU.
(e) Put an access platform in position at fuselage tail cone.
(f) Open APU access doors 315AL and 316AR.
(2) Cleaning of all power feeder wiring installed in APU and accessory compartment (only contaminated wiring)
(a) Clean wiring if there is dust and hydraulic mist contamination (Ref. ESPM 205500).
1 On AC/DC feeder routes: : APU feeder (G and E routes, generator route).
2 On flight control wiring route: APU monitoring.
(3) Close-up
(a) Make certain that the work area is clean and clear of tools and other items.
(b) Remove safety clip and tag, and close circuit breaker 50KA.
(c) Close APU access doors 315AL and 316AR.
(d) Disconnect the aircraft electrical ground connection (Ref. 24-00-00,



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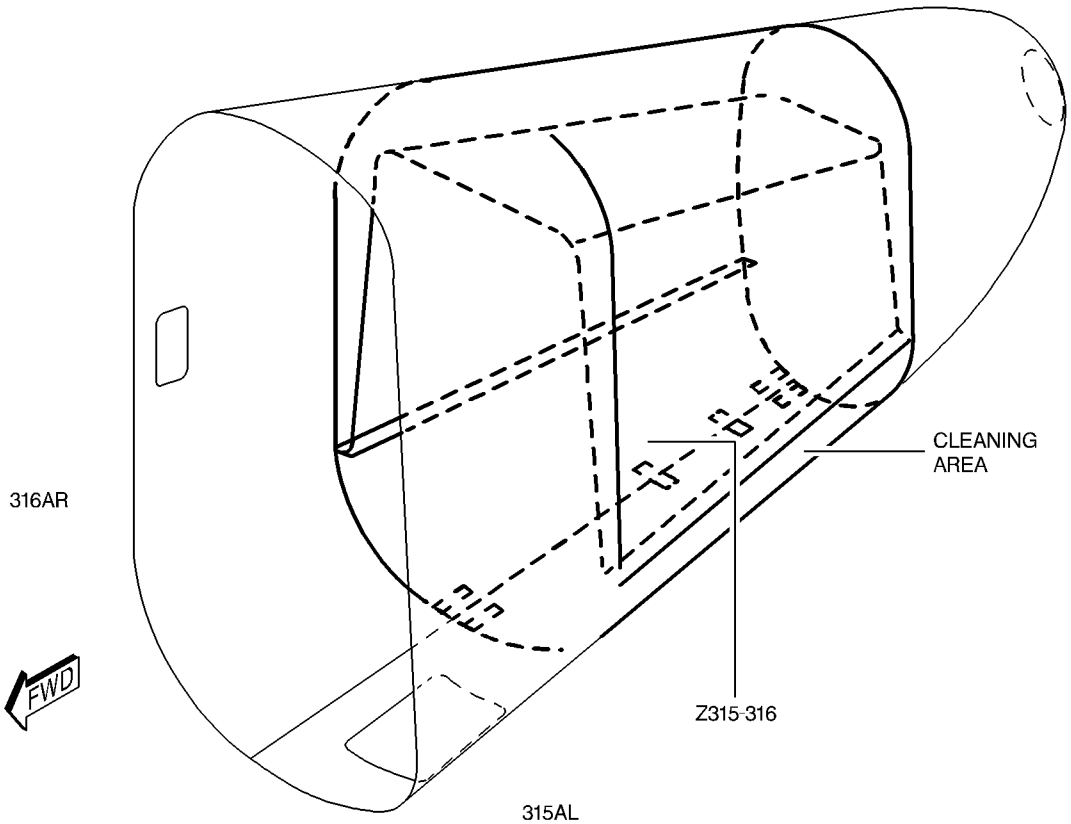

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APU and Accessory Compartment - Cleaning Area -
Zones 315-316
Figure 717

P. Block 301).
(e)Remove warning notice.
(f)Remove access platform.